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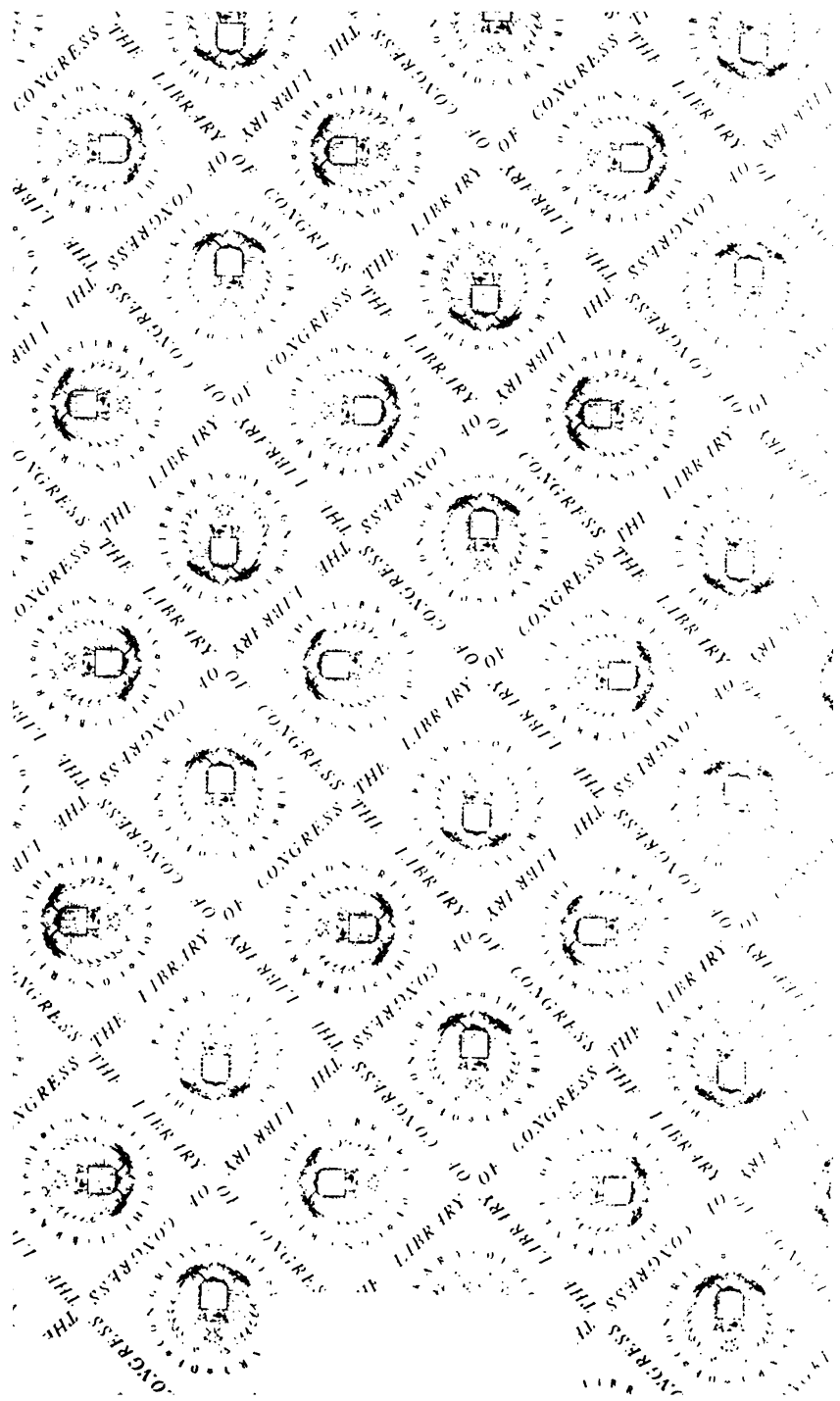
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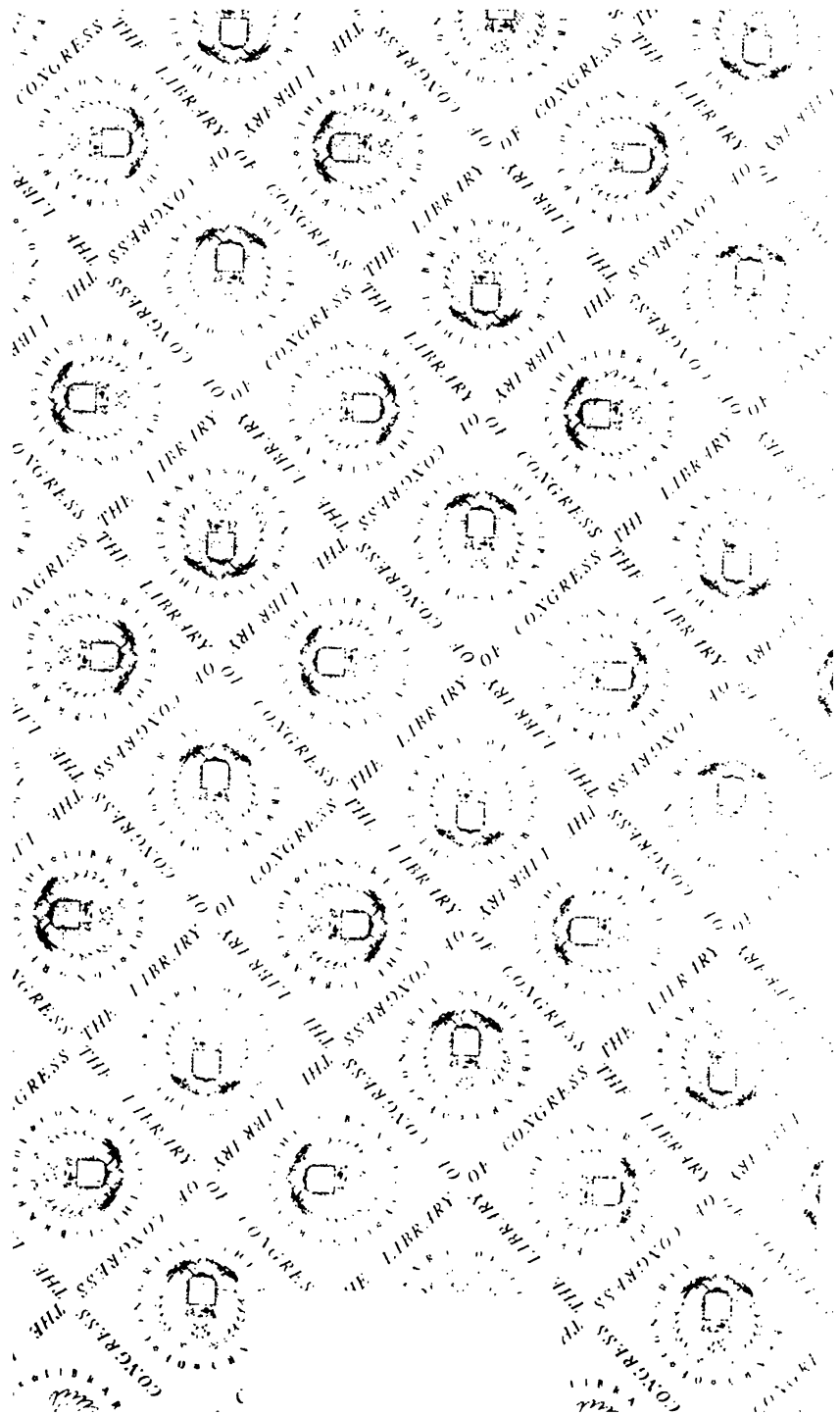
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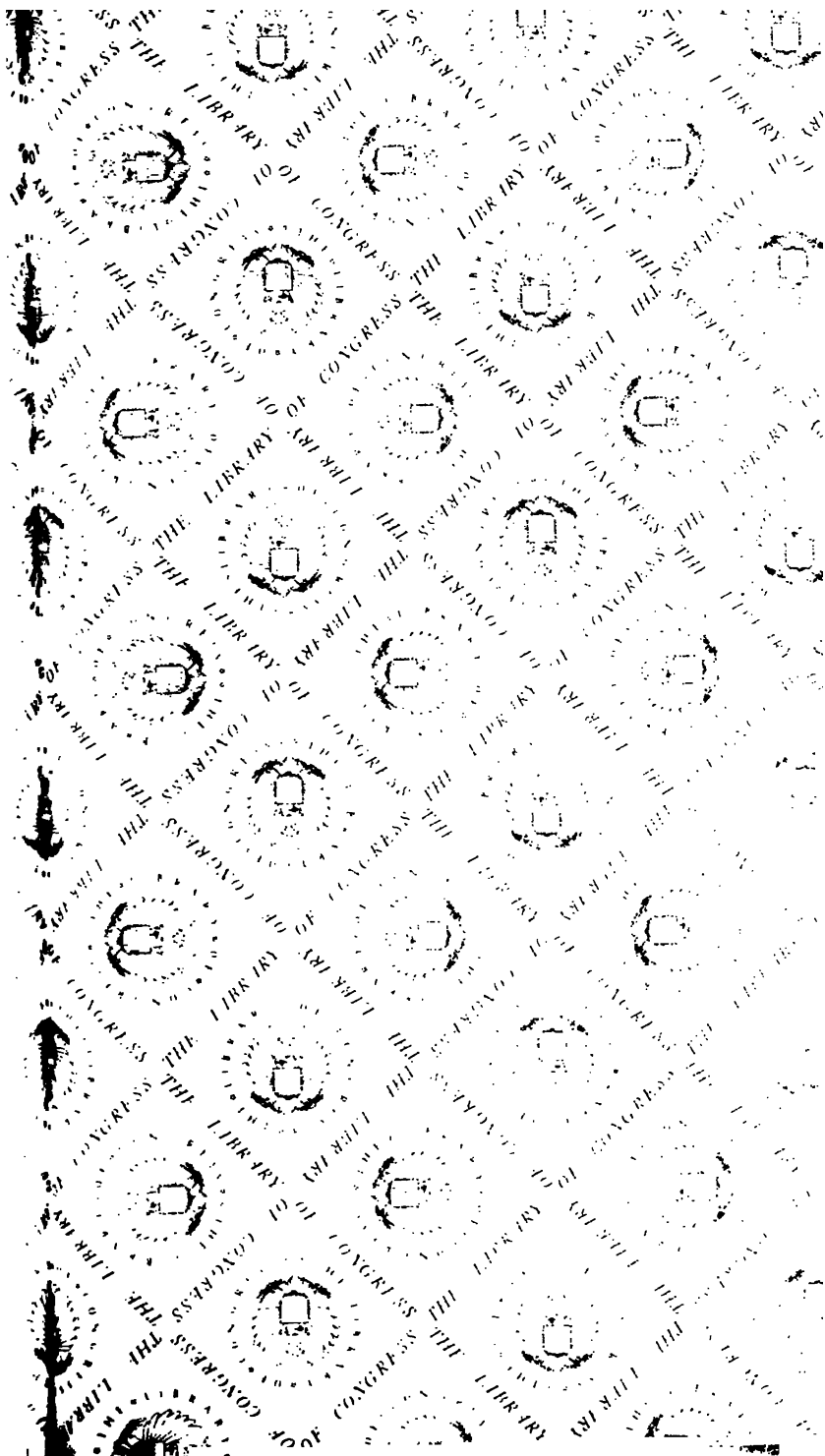


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# JOURNAL

OF THE

## [ AND WEST AND SOUTHERN COUNTIES SOCIETY. ]

FOURTH SERIES.

VOL. VI.

1895-96.

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WORK AND LEARN.  
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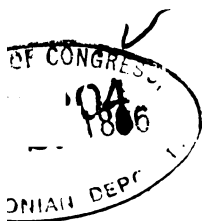
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"He that goes about to forward agricultural improvement must begin by finding out the true reasons of what is called routine, or the 'custom of the country.' It sometimes happens that these reasons are only accidental, and then you may dismiss them fearlessly; but often it turns out that every-day practice rests on a solid foundation of facts; and then if you make an onslaught on local prejudices, they will be sure to beat you.

"The true course for the agricultural improver is, to take one step at a time, to gain a clear insight into facts by experience, not to try to go too fast, and to trust to the work of time.

"If practice which sets up to do without theory is contemptible, theory without practice is foolhardy and perfectly useless."—*From the Rural Economy of England, Scotland, and Ireland*, by LEONCE DE LAVERGNE.

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JOURNAL  
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SOCIETY.

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Original Articles.

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I.—*The Construction of Dairy Herds.* By Prof. J. P. SHELDON.

THE leading principles to be borne in mind in constructing profitable herds of dairy cows seem to be less definitely understood than was the case formerly. Dairy farming, indeed, so far as the production and destination of milk are concerned, is in a state of transition and development. Many new ideas have been imported into it, and old ones have been, or are being, corrected and expanded. The growing demands of the milk trade at home, and the expansion of dairying in many foreign countries, have brought about in the last twenty years or so a veritable transformation in the aims and objects of many of our more progressive dairy farmers. To those who were engaged in dairying in the sixties, and are still so engaged, a retrospective glance over the period which has since elapsed will make it clear how large a change has been already accomplished, and disclose the probability of an increased rather than a decreased tendency to adaptation as the years roll on. Until the end of the third quarter of the present century we were comfortably settled in what seemed to be a position of assured and permanent prosperity. But soon after the seventies dawned upon us, in the midst of a too-brief period of unexampled success, there were already upon the horizon specks which arrested the attention of those who were given to peering into the future. Subsequent experience has amply shown that there was cause enough and to spare for anxiety, and we find now, to our dismay, that Old England has become the "dumping ground" of competitive products from all parts of the cultivable globe. The areas from which these products are forthcoming are constantly being extended by means of railroads; and we had better

prepare ourselves to face this fact, viz., that the process of opening up vast tracts of fertile land in many foreign regions is at present in its infancy.

#### SOME OF OUR COMPETITORS.

It will be admitted that distant countries which at present are merely sending beef, and not as yet dairy products, to our shore are to all intents and purposes competitors with our own dairy industry, though less obviously so than others which send us their cheese and butter. The great amount of foreign beef which comes to us from the other side of the Atlantic, for instance, reduces the value of the surplus cattle which our dairy farmers have to dispose of, and to that extent tends to diminish the profits of dairy farming in this country. Prior to the arrival of American dressed beef, the first consignment of which came over from Canada in February 1874, we thought we were secure against transatlantic competition, at all even so far as beef was concerned. The new trade, however, when once it had a start, rapidly developed, with respect not only to dressed beef, but also to live cattle; it has been extended greatly to the south of the Canadian territories, for not only the United States but several of the South American Republics have gone into it. That the supply of beef as well as of dairy products from the United States may in a few years time become permanently reduced, is probable, on account of a rapidly increasing home demand, but we may expect an expansion rather than a reduction of the trade from the vast ranching countries of South America. And now the still more distant Australia, not content with sending us stupendous quantities of frozen mutton, is engaged in testing the feasibility of shipping fat cattle alive, a distance of thirteen thousand miles across the ocean and also in building up a big State-aided trade to our shores in butter and cheese. Canada is making a national effort to establish in this country a trade for her butter as extensive and as creditable as that which she has obtained for her cheese. And, last of all, we have been threatened with an inundation of frozen milk from Scandinavian countries. These are the influences—and we have not come to the end of them yet—that have compelled us to modify our dairy practice.

It may be well to inquire briefly what those modifications consist of, and in what direction or directions the stream of tendency is running; and when these general but pertinent questions have been disposed of, we may proceed with the more concrete part of the subject, upon which this article may perhaps, throw a ray or two of light.

## THE MILK-TRADE.

I have not yet seen anything like an adequate acknowledgment of what the great and modern trade in country milk—which we may term railway milk—has done to keep our dairy farming well on its feet during the general depression of the last fifteen years. If we reflect on the condition in which dairying would unavoidably have been long since, but for the constantly expanding milk-trade, there stands revealed a precipice over which thousands of dairy farmers must have gone headlong to ruin. The prices of cheese and butter are, in all conscience, low enough now, but what would they have been if the urban trade in country milk had never been developed?

Future writers on the subject will hold it true that the milk-trade was the new departure in dairy farming which, more than anything else in the British Islands, distinguished the last quarter of the nineteenth century. The tendency is still running towards an expansion of the trade, accompanied by ebbs and flows in the tide which are of no great or lasting importance. This increase in the sale of fresh milk has had a greater effect in many places, than any of the other modifications of our practice, in altering fundamentally the composition of dairy herds; and yet there is something further which must change even more than it has done the hap-hazard ways of breeding cattle that have been in vogue for centuries amongst the rank and file of dairy farmers.

So long as all dairy farmers made their milk into cheese and butter at home, the question of quality in the milk did not force itself into the ordinary bucolic mind, but it has been brought into prominence by the demands of the milk-trade, and by the creation of large establishments for the manufacture of cheese, butter, or condensed milk, as the case may be. There is now the probability of milk being, both in the trade and in the establishments alluded to, paid for on a basis of quality, to be determined by the percentage of solids. This, indeed, though generally in a somewhat crude and unscientific way at present, is also a tendency of the period, and there is reason not only to hope but to believe that it will in course of time become established as a sound and appreciable element in the commerce of the dairy. This accomplished, the sequel will be seen in the greater care taken in the construction of dairy herds, with the object of securing not only quantity but quality of milk.

### PAYMENT FOR MILK BY RESULTS.

The "payment by results" for milk—that is to say, on a basis of quality—is already well established in Australia, where it is regarded as vital to the continued prosperity of dairy farming. We are told by Mr. Lance, the energetic secretary of the Euroa establishment, that the combined system of dairying was calculated to do "absolute injury," and "factories and creameries would have brought their own destruction by encouraging the production of quantity of milk at the expense of quality." It is obviously a desirable thing that every farmer should receive for his milk just what it is worth in comparison with other men's, and this can only be done when "payment by results" has been established in the milk-trade as well as in factories and creameries. It will be understood that farmers engaged in producing milk for the trade have aimed at procuring cows that would yield a large quantity of milk, whatever its quality might be, and that the cows have been fed with the object of stimulating a large flow of the lacteal fluid, because the idea generally prevailed that milk as it came from the cow was not adulterated, no matter how poor it might be. True, it was not adulterated in the ordinary meaning of the word, but it was impoverished, and this was a distinction without much practical difference. It will be admitted too that this question of quality in milk is an unsatisfied and even a burning question in the milk-trade, a question, indeed, that must ere long be settled on a permanent basis. The fixing of a standard of quality is not likely to provide a permanent basis, for it cannot possibly be equally fair on all people who are engaged in producing milk for the trade. It is very widely believed now that payment by results is the only solution of the problem that stands a good chance of closing the controversy.

### QUALITY AND QUANTITY.

It will now be seen that in these days there are influences at work which are likely to have far-reaching effects in reference to the breeding of cows and the construction of dairy herds. The competition we have to meet in beef and dairy products, seen and increasing as it is, will hardly allow us to go on in the "happy-go-lucky" way of our forefathers. We are feeling the strain severely now, and the probability is that it will increase rather than diminish before the century closes. Every means of technical instruction universally brought to bear on dairy work, if ever practicable to ensure good cheese



and good butter in every dairy throughout the length and breadth of the country, still the reform would be one-sided and incomplete if we should fail to make the desired improvement in the breeding of cows for quality as well as for quantity of milk, and indeed, also wherever we can, for quality as well as quantity of beef. Absolute perfection is not, as a general rule, attainable in the breeding of cows for milk, or even for beef. This must, no doubt, be freely admitted; but when we look around us, in any given dairy district, it is obvious to any experienced man that a great interval separates us still from that which really is attainable—so far, that is to say, as a very considerable number of dairy farmers are concerned.

Complete success in the breeding of cattle for dairy purposes, and indeed for others too, is, to a great extent, intuitive, but it is at the same time an art which is susceptible of great development by men who will bestow the requisite care and study upon it. In a world like this, it is idle to hanker after utopian perfection, and practical men do not give way to this in the everyday business of life; they strive instead after improvement within the limits which experience justifies. But, in the domain of dairy farming, it is melancholy to see so many fall far behind that which is comparatively easy and simple of attainment. Look, for instance, at the weedy, miserable bulls that many farmers are content to use in their herds,—wretched quadrupeds that should never be allowed to live beyond the age of veal. Some men may say, by way of excuse, “my poverty, but not my will, consents”; yet, on the other hand, it may be remarked that no man can really *afford* to use inferior, low-valued bulls in his herd. That any man should continue to do so, year after year, can only be regarded as a kind of heedless infatuation which precludes all hope of improvement.

#### “THE BULL IS HALF THE HERD.”

This, indeed, is an axiom which should be drilled into the mind of every farmer's son, who is himself to be a dairy farmer—drilled in until he fully realises what it means. That there are many of the present generation of farmers who do not half comprehend the vast importance of this, is greatly to be feared, for it is plainly enough seen in the inferior sires that are kept for stock purposes. It would be interesting to hear the answers such men would give to the following question:—What sort of stock do you expect such a bull will get? Or:—Do you really expect to pay your way as a farmer by using a bull like that? Or:—What would you say if you saw another man burdened with a similar load of crass stupidity? Unfortunately

it never occurs to them to put such questions to themselves, and it is too commonly nobody else's business to do so in the default.

#### WELL-BRED BULLS.

There is no excuse nowadays for a man who uses scrub bulls among his cows. Plenty of well-descended bulls are to be had at prices within the reach of any man who can afford to keep cattle at all—not necessarily pedigree, herd-book but well-bred beasts whose ancestors had the reputation of being good dairy stock. A bull is none the worse for having a pedigree, or for being in the herd-book; there are advantages therein *if the bull himself is what every bull ought to be*, viz., free from all kinds of disease or weakness, organic or otherwise, free from forcing and pampering, from the curse of impotency, and from physical defects. I have known gross mistakes committed by the purchase of handsome bulls at fancy prices—fancy, that is to say, from a tenant farmer's point of view—bulls that were glorious to look at, but ruined in constitution, or at all events in the reproductive organs, by the vicious system of forcing which has been too common in pedigree circles and which everywhere would be far more “honoured in the breach than the observance.” An old friend of mine, now gathered to his fathers, a prosperous farmer in the Peak of Derbyshire, some twenty years ago had the best unpedigreed herd of dairy cows it was ever my good fortune to see, carefully bred by him and his father for scores of years on the same farm. The farm was sound and good, situated on carboniferous limestone, at a considerable elevation, and was, for six months of the twelve, well exposed to what the immortal Shakespeare would have called “a nipping and an eager air.” In his declining years, when judgment and self-reliance, presumably becoming less vigorous than of yore, my friend was persuaded by a sporting relative to invest in a high-priced, good-looking, blue-blooded, pedigree bull—a thing he never had done and never of his own free-will would have done. The result was most unfortunate, and in a sense disastrous, for that greatly—and wholly for the worse—changed the character of that famous old herd of cows. The bull and his offspring doubt were too “finesse” for the climate—his breeding and rearing made him so, and his delicacy was transmitted to his calves which he sired.

## THE SORT OF MAN TO BUY A BULL FROM.

I have no hesitation in saying that a farmer of the type of my friend, before he had dabbled in a strain of bovine blood which he did not understand, is the right sort of man to go to for a bull—a farmer, whose herd has been carefully bred under the master's eye, bred for milk, flesh, constitution and symmetry, during a long spell of years, and who has not pampered his stock for show, or raised them after the manner of plants in a conservatory. Such men among Shorthorn breeders are the Collingses, Maynards, and Hutchinsons of to-day; and the type of them is to be found in every dairying county still,—not among Shorthorn breeders only, but among breeders of Devons, Red Polls, and all other breeds of dairy cattle. Cattle bred on these lines are usually deep milkers, and their milk is of more than medium quality—good enough, indeed, to pass, with a wide margin to spare, the understood standard of to-day. Beyond this, they are, according to the capacity of the breed, above the average as graziers' and butchers' beasts. These are qualities which, in a reliable and permanent form, can only be secured by the careful supervision that such men as those we have mentioned bestow on the breeding of their cattle, and these are the cattle which alone can be depended on to transmit the said qualities to their offspring.

The remarks in the foregoing paragraph refer not to one breed only, but, in varying degrees, to all. The importance of using good bulls admits of no modification for different breeds of cattle; it is, in fact, a rule, the application of which is constant and universal. The application of the principle will depend, so far as extent is concerned, on the judgment and energy of individual farmers, and this in its turn will govern the number of those who, in the future, will be looked upon as the right sort of men to buy a bull from. In any case, it may be taken for granted that such men will not, and, as a matter of fact, never can, become too numerous. Well would it be, indeed, for British dairy farming, if every man engaged in it as a farmer, working his way upward from the beginning, came to be regarded as the right sort of breeder to go to for a bull!

## COWS OF A DAIRY HERD.

As a general rule, it may be said that a beginner is not ill-advised to construct his dairy herd from the cows of the district, though it is nevertheless true that, in many cases, cows may with advantage be brought from another part of the country and in a southerly direction. This sort of practice will depend

on the character of the stock which the district possesses, and on the beginner's purse—this last being not the least of the considerations. If the cattle of the district are tolerably good of their kind, it is as well to buy the best of them that are to be had at reasonable prices—if the purse will meet these calls upon it. To buy moderate cattle, and to improve them by the use of superior bulls, is a pursuit which should kindle the ambition of beginners; there is, at all events, more interest in it than there is in buying the best, which need no improvement, and in the long run there will be, or should be, a good deal more profit in it as well. To buy, at a low price, middling heifers of sour constitution, and to “grade up” their progeny by employing really good sires, may not be the quickest road to perfection, but in competent hands there is money in it. But to buy “weeds,” and especially unsound “weeds,” is a mistake, and will bring any man to repentance quicker than the parson. Lean heifers from sour land can usually be bought cheaply, and as a rule they turn out well, provided they are fairly well bred, and are lean from no other cause than over-stocking and under-feeding, otherwise it is best to have nothing to do with them. While there are some dairying districts to be found where the cattle are good enough for all practical purposes, there are others where this is not the case, and in such districts a beginner may not uncommonly do a good stroke of business by introducing better stock from a distance. Unfortunately, however, beginners are generally wanting in the experience that is so valuable to a man who goes cattle-buying, and caution does not always go hand in hand with inexperience. The quest of suitable cattle is fairly well supplied with the interests that give zest to our lives, and perhaps it is a good thing for young men to go on the quest with the feeling that they have no capital to throw away.

#### BREEDING FOR QUALITY OF MILK.

So far as obvious tendency goes, it may, with tolerable confidence, be assumed that, in the breeding of our dairy herds, quality, as well as quantity, of milk will in the future be well cultivated. Let it be borne in mind that a copious flow of milk represents a natural function artificially developed, and that it has been attained, to some extent, at the expense of quality, in most of our deep-milking breeds. Let it also be borne in mind that, in a wild state, cows usually give but little milk, though the quantity is comparatively small, and the flow is not long maintained. We shall then be in a position to realize that as quantity has been developed to so marked a degree, it is possible by careful selection and mating of animals

to raise the quality to a much higher position than is generally reached at present. In several breeds of cattle, and with individual herds of other breeds, this capacity has long ago been realised, and there is no room to doubt that the same improvement can be extended to nearly every herd and every breed of cows within the limits of the British Islands.

When the principle of payment for milk on the basis of quality has been generally established—that is to say, when each unit of the solids of milk can command a given fraction of a penny per gallon—we shall find that it is quality of milk, *plus* quantity, that will become the leading point to be aimed at in the construction of dairy herds. Milkers, which in either quality or quantity are inferior, will be promptly discarded from our herds, as not being worth breeding from at all. This is, and has long been, done by the most enlightened dairy farmers of this country, and our hope must be to see it become not only general but universal. Until recently there was always some considerable difficulty experienced by a farmer in ascertaining the quality of any given cow's milk; the task is much easier and simpler now, and though the difficulty has not entirely disappeared, it is much diminished, and the method is simple enough for anybody. The old-time test was generally the thickness—or thinness—of the cream thrown up on that cow's milk in a pan in the dairy, and it will be admitted now that the test was not by any means exact. Still, so far as it went, it was useful, and a tolerably reliable idea was obtained as to the quality of the milk. But there are now several effective and comparatively simple methods of testing the quality of milk, and each year finds them simplified or otherwise improved. The progressive breeder of dairy cattle in the future will regularly employ one or other of these tests to ascertain the quality of the milk yielded by each of his cows, and the man who neglects to do so will be left behind in the struggle with fortune. The inducement to employ these tests will arise as soon as the sale of milk on a basis of quality—not a mere standard of quality, but a percentage of solids at a given price per cent.—shall have become generally established.

#### INDUCEMENTS TO BREED FOR QUALITY OF MILK.

The standard of the Society of Analysts, upon which prosecutions for adulteration of milk are commonly based, is  $2\frac{1}{2}$  per cent. of fat, and  $8\frac{1}{2}$  per cent. of solids not fat,—together 11 per cent. of solids. This is a standard which does not err on the side of being too high, and it offers no special inducements to breed for quality of milk.

The milk-trade, on its present basis, does not supply such inducements, nor indeed do cheese and butter factories. On the contrary, they provide incitements to breed for quantity instead, and even for adulteration of milk in cases where men are content with a low standard of honesty. Hence it is that factory managers and urban milk salesmen have to keep a sharp look-out and to test suspected milk frequently. An American writer—presumably a dealer or a factory manager—says:—"The Babcock test beats the Bible in making a man honest. I have been quoting Scripture to my people for years, and could not improve them. I put in a Babcock test and everything came right to time." And an Australian expert says the Babcock test "supplies the great and only incentive to attend to the improvement of the breed, to careful selection, to the study of fodder, and to the intelligent handling of cows." When each man's milk is paid for on a basis of quality, whether it be sent to the salesman or to the factory, the producer will then attend as he ought to the breeding of cows for quality as well as for quantity of milk. Wherever the farmer makes his milk into butter or cheese at home, the inducement exists already.

#### CONSTRUCTING A HERD.

In constructing a dairy herd, young cows—chiefly heifers—suitable to the land and the climate should be obtained, and great care must be taken to have them of sound constitution and given to milk production. For strong land, strong cows are as a rule best adapted—that is to say, big cows like the Shorthorns—and for lighter soils, lighter cows; while for cold climates the Ayrshires would answer the purpose of dairy farmers better perhaps than any other breed. A northern breed may generally with advantage be brought to a southern climate, but it is a different thing where the course of migration is reversed, unless the distances be short, and the question of altitude balances that of latitude. A good bull from sound land is an indispensable factor both in the construction of a first-class dairy herd and also in its maintenance after construction may be said to have been completed. No objection ought to be taken to the bull being a pedigree animal, provided he possesses the physical qualifications already denoted. On the contrary, these qualifications being assured, it is distinctly an advantage that the bull should have been entered in the herd-book. The feeding and training of cattle—training, which develops docility and milking qualities in dairy cows—are points which few men who are careful breeders would be at all likely to neglect, but with regard to feeding, it may be stated with

emphasis that forcing and undue fattening of dairy cows, and of bulls and young stock generally, is a practice greatly to be deprecated.

The keen competition of the period will not have come amiss if it should bring about a widespread reform in the construction of dairy herds,—a reform which, be it said with regret, is urgently needed in most parts of the kingdom. The inheritance we have succeeded to, in the different breeds of cattle for which the British Islands are distinguished, is grand beyond compare. It is a privilege which, in the combined attributes of variety and excellence, we enjoy to a degree unapproached in any other part of the world. It is a legacy from those who have gone before us that we must not fail to transmit unimpaired to those who follow us. As our forefathers did so much for the improvement of our native breeds of cattle, it becomes our moral duty, as it ought to be our pride, to emulate their excellent example. We possess the fundamental requisites, knowledge and opportunity; we have the soil, the climate, the breeds of cattle, and the accumulated experience of many generations of men who were thrifty, intelligent, plucky, and successful. Our position to-day, with regard to the materials that we have to work with, is, to say the least, equal to that of our predecessors; and we may venture to hope, despite the general condition of depression under which agriculture now labours, as compared with the prosperity of twenty years ago, that the requisite inducements will not be absent in the future. To accomplish the work that lies before us, much—nay, everything—depends on ourselves, on our energy, our judgment, our spirit of enterprise, our care and forethought, and our desire to excel.

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II.—*The Use and Abuse of Artificial Manures.* By Professor JOHN PERCIVAL, M.A., South Eastern Agricultural College, Wye, Kent.

THERE is no subject connected with farm practice which is of such great importance, and yet at the same time so much a blind game of chance, as the use and application of manures.

Farmyard manure has to be used in one way or another, and fortunately, if put on the land at all, it can practically never fail to produce some good effect; but how rarely do we see even this staple substance properly managed, or adequate precaution taken for its satisfactory storage and use. All this, too, in

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spite of the fact that for over 200 years—since Hugh Platt's time—the deleterious action of sun and rain upon exposed dung heaps, the importance of covering them with turf, and the use of dung-pits, has been preached continuously.

It is, however, the so-called artificial manures which are most frequently misunderstood and misused; either they are entirely neglected, distrusted, or looked upon with unfavourable prejudice and suspicion, or some are used without any reference to their composition, and in complete ignorance of the function or business they perform. Not once, but often, have I found them being used for no other reason than that they happen to be called "manures." Sometimes the sole reason determining their use is their low price, and even rank smell, or the fact of their being offered for sale by some particular merchant or manufacturer.

Lest it should be thought that the difficulties involved in these matters are under-estimated, it is essential at the outset to state that the whole subject of manuring is one of great complexity, and with all the accumulated knowledge of the present day, both of scientific and practical men, it is impossible in many instances to give any precise advice as to the most economical and beneficial manure to use for a particular crop on a particular soil. Much remains which is beyond present knowledge, and must be left for future work to settle.

There are, however, certain points in connection with the application and use of manures which are beyond dispute, and which, if a farmer is to succeed or make any improvement on the present state of things, he must strive his utmost to grasp and understand.

It is the object of the present article to give, if possible, an intelligible account of the way in which artificial manures work—what may reasonably be expected of them—and the composition and uses of a few of the most important.

My experience from boyhood, and especially that gained in my work among farmers during the last three or four years, has convinced me that, apart from difficulties arising from imperfect chemical and botanical knowledge, a great part of the abuse and misunderstanding, and distrust of these artificial products (superphosphate, nitrate of soda, &c.), is due to the use of the word "manure" in connection with them. They are not manures in the sense in which farmyard manure or dung of animals are manures, and to use them with the idea that they are completely similar to dung, and only different in their degree of action, is a serious mistake.

It may not be out of place to point out that the term "to manure" is a contraction of "to manœuvre," and originally



meant merely to till, or cultivate (to work by hand). Then its meaning was extended, and included any process of "tempering, altering, renewing, or adding unto the land, or applying any subject whatsoever thereunto for its improvement and advantage." Burning or denshiring (Devonshiring or Denbighshiring), and the addition of lime, chalk, marl, sand, clay, shells, blood, fish, dungs of all kinds, rags, hair, and malt dust, were all in use in the sixteenth century, and processes and substances were alike spoken of as manures then.

Although nowadays tillage operations are rarely spoken of as manures, the popular and most general notion of the latter is much the same as in early times, namely, materials or substances applied to the *land* for its improvement. In dealing with them vague ideas of benefiting the *land* absorb almost the whole attention, and very little or no thought is given to the growth and life of the plant or crop.

#### PLANT REQUIREMENTS.

Now, the successful application and use of *all* manures depend on a knowledge of the plant's requirements, as well as of the constitution and character of the soil; but especially is this the case with the profitable employment of "artificial," the origin and extended use of which are largely due to the discoveries made respecting plant growth at the end of the last and the beginning of this century. The most important of this class of manures are simply *food for plants*, or "fertilisers," and must be looked upon in this sense only, their effect and influence upon the land being so small that we may leave it out of account altogether. It is essential, therefore, in dealing with artificials, to look from the soil, as it were, towards the plant or crop, and first of all to learn as much as we can about plant requirements. It is not necessary that we should become skilled chemists or botanists, but a simple groundwork of knowledge of how plants feed and grow is of very great service in checking wasteful and promoting intelligent use of manure.

We must, at the outset, be thoroughly aware that plants are living things—"living" in the same sense in which animals are "living"—and that, as in the case of animals, for their healthy growth certain conditions are absolutely necessary. They require warmth, a proper supply of fresh air, and water. Without warmth, growth either ceases, or is slow; while too great heat kills them. If the various parts of their body cannot obtain fresh air they die of suffocation; and without water they collapse and dry up. As regards the growth of crops, the roots of plants are the most important parts to consider.

Their connection with the soil, and their business of taking it substances presented to them, make it absolutely essential that every effort should be made to manage and alter the soil so that it may become a suitable habitation for these roots. The ground must be stiff enough to support them firmly; it must be drained of all unnecessary water, and yet must hold enough of water in times of drought; fresh air must circulate through it, hence it must be open and porous. All these matters can be largely controlled by the farmer, by the addition of sand, clay, litter, and other substances; by draining, ploughing, harrowing, hoeing, &c. This side of the subject it is not our business to more than mention, yet it may be remarked that it is of the first importance, as without proper tillage and careful endeavour to obtain a suitable mechanical condition of the soil, the application of manures is a useless waste. Defective management of the soil cannot be made good by fertilisers or manures alone.

Assuming that our soil is so prepared as to be a healthy and suitable dwelling-place for the roots of plants, there remains another thing to consider, and that is the *food for the roots*. It would be of little service to shut up a family of human beings in the most perfectly-constructed house, with draught-proof heating arrangements, and ventilation in a perfect condition, without at the same time supplying food. Exactly the same holds good with all living things. Hence it is possible to have a soil perfect, as being an excellently prepared dwelling for the roots of all crops, *i.e.* so far as its mechanical condition is concerned, and yet this soil may be barren and unproductive from lack of food. Such is practically the case with our ground which has been cropped several times in succession without the addition of manure of any kind.

We thus see the necessity for clearly understanding what plant-foods really are. Formerly—before chemical knowledge was developed—plants were supposed to grow by the aid of some indefinite spirits, humours, essences, or principles absorbed from the ground. Vagueness and uncertainty prevailed, and even now to mention plant-foods in connection with practical cultivation of crops often does little more than bring up vague notions respecting growth which have been handed down for ages. Let me at once say that plant-foods are as real as foods which nourish human beings, and can be seen and handled with the same ease. Instead of being obliged to imagine and speculate as to what plants take from the ground and the air, we now know exactly what the plants require, upon what substances must be supplied to them to produce a good crop, and also what it is useless to supply.

One step towards determining what plants feed upon is to find out what they are made of. Although this cannot be done completely without a training in the science and practice of chemistry, by heating plants we soon discover that they contain a considerable amount of water. Further heating shows that charcoal or carbon is always present, and, if the plants are burnt as completely as possible, a small quantity of grey or yellowish ash is always found. This ash varies in amount according to the kind or part of the plant burnt, but it invariably contains six substances. It may contain more, but the following six are never absent: iron, lime, magnesia, potash, and substances called sulphates and phosphates. Besides the above-mentioned materials, a substance called nitrogen is found making up part of the body of all plants. And that these are plant-foods is proved by the fact that all attempts to grow plants without them end in failure. The charcoal or carbon (and sometimes the nitrogen) plants obtain from the air. All the other substances are taken from the soil, so that in the growth of a crop, say of wheat, every plant is absorbing and lifting out of the ground, into its leaves and stem, a small amount of these food materials. Although the quantity taken by each plant is very small, over an acre of ground it amounts to a great deal. More than a hundredweight and a half of the soil is taken away in an ordinary crop, and it is the best and most useful part of the ground which is thus removed—the useless bulky substance being left. Instead then of being vague humours, or principles, plant-food materials are very real things. The supply of these materials in the ground is limited, and the growth of a few crops is sufficient to reduce it to such an extent as to make the further growth of crops unprofitable. In order to restore the fertility of such exhausted ground, food materials must be supplied, and this is the primary or chief object of all manures, “artificial” or otherwise.

Some—chiefly bulky natural manures—alter and modify the mechanical condition of the ground when added to it, and thus affect the growth of crops; but all contain plant-food materials in greater or lesser degree, and when applied to the soil increase the stock of plant-food therein. The most important artificial manures are, or should be, merely more or less concentrated food for plants, and to use them intelligently with practical and economic advantage is the chief consideration.

There is an important peculiarity possessed by plants, which must have great attention, as want of knowledge upon this point leads to constant misapprehension, abuse, and waste of artificial manures. It is this—the most carefully conducted experiments have shown that plants or crops cannot

grow unless they can obtain ALL the ingredients previously mentioned, namely, water, nitrogen, iron, magnesia, lime, potash, sulphates, and phosphates. That is to say, they must have a varied diet. If only *one* of these food constituents is missing in the soil the others might just as well never have been there at all. For example, if ground is exhausted of all its lime, crops will not grow, and it is quite useless and wasteful to apply; say nitrate of soda, or kainit (neither of which contain lime), in the hope that they will be able to restore the fertility of the ground. Thus it will be clearly seen that one artificial manure cannot take the place of another unless they both contain the same food ingredient. The application of the word manure to two substances does not make them the same. Their composition should be known if they are to be profitably applied. Some idea of what food constituents are wanting in the ground should also be obtained if possible.

While all the food ingredients mentioned above must be obtainable by crops if they are to grow, three need to be specially considered, namely, nitrogen, phosphates, and potash, as these are the first to run short in the ground when crops are taken away. In some cases the supply of lime may run short. But the three substances just mentioned are the principal ingredients present in artificial manures, upon which their market value and usefulness depend. It is not possible for farmers to check the composition of these manures; but chemists can readily and exactly determine how much of the useful substances named are present in any sample, and their analyses and reports should in all cases be obtained where either large or small quantities are used. It is very unadvisable for farmers to use such a manure without an analysis being first obtained. Unscrupulous or ignorant dealers have often obtained a high price for substances, passing under the name of "manure," which contained little or none of these three useful ingredients. Absolutely useless cotton "waste" has been sold for useful wool "waste," and salt, washing soda, and Glauber's salts, for nitrate of soda.

To protect farmers against such fraud the Fertilisers and Feeding Stuffs Act, 1893, made it compulsory on all sellers of artificial manures, in quantities larger than  $\frac{1}{2}$  cwt., to give a notice which should state and guarantee "what is at least the percentage of nitrogen, soluble and insoluble phosphates, and potash, if any," in the article they sell; but it has become the practice of many dealers to merely state an insignificant and nominal percentage of these substances, so complying with the words of the Act, and charging very much more than such nominal guarantee warrants. Such attempts to evade the AC

ould be resented by every farmer, and after purchasing any manure he should obtain an analysis and report on its pecuniary value from the Society's chemist or the analyst acting under the Fertilisers Act in his county.

Now any manure containing *all three substances*—nitrogen, phosphates, and potash—will work beneficially upon all crops and upon all soils which are cultivated, even if the latter are completely exhausted; and, to avoid difficulties and trouble, it would at first sight appear the best and simplest plan to buy manures which are mixtures of or contain these three ingredients. This, however, is an uneconomical practice, as manufacturers invariably charge for such mixtures more than they are worth, and although their “grass,” “corn,” “turnip,” and “potato” manures will always work, because they contain all the necessary ingredients of plant-food, they should be avoided, unless a satisfactory report regarding reasonable cost is given by a trustworthy chemist after analysis.

It is the best plan for the farmer to purchase the separate ingredients and mix them himself, bearing in mind the facts about each individual manure to be subsequently stated. It is easy to make a mixture containing all three substances; but to apply it indiscriminately to all crops would be a mistake, for this reason, that, although all crops require the same three substances, they do not all require similar amounts of each. Some require more of one constituent than another, and to use the same mixed manure for all crops would mean waste. There may also be naturally a large amount of one ingredient in the soil of a particular farm or field, and here two of the ingredients would supply all that was wanted.

Plants can make no use of any food which is not soluble in water or in very weak acids. Manures or food materials which are not soluble, to begin with, must become soluble, sooner or later, in the soil, or they cannot be of any use to the plant. Plants only absorb through their slender roots from the soil substances or foods which are easily dissolved. The more soluble manures are, the more readily they get into the plants, and, of course, the more rapidly are they washed out of the soil, and so if no plants are present, or when growth is at a standstill.

Slow-acting or “lasting” manures are those which are not soluble to begin with, but which in time become soluble.

Summing up all we have stated hitherto, we see that before we can apply a manure of this artificial class satisfactorily, with the least waste and best results, the following four considerations would engage our attention:—

1. What is the composition of the manure? That is, what kind of plant-food material does it contain? Does it contain

nitrogen only, or potash or phosphates only, or two of these substances, or all three?

If all three, it is a *complete* manure, and will, to some extent, benefit all crops on all soils. If only one—say nitrogen—it is an *incomplete* manure and may be of use, or may not, according as the soil is, or is not, deficient in that ingredient.

2. Are the ingredients in it soluble or insoluble?—which amounts to much the same thing as the question, Is it a quick-acting or a slow and lasting manure?

If soluble or quick-acting, it would generally be applied as a top-dressing to plants actually present and actively growing, in order to prevent waste. Slow-acting or insoluble manure would not be so liable to rapid waste, and would be useful to plants of a perennial character—plants always on the ground in some form or other—and of slow growth. Such a manure, especially if complete—*i.e.* if it contained nitrogen, potash, and phosphates—would often be useful to add to the ground as a foundation for all crops, the various kinds of special *incomplete* manures being added afterwards, according to the kind of crop to be grown and the stage of growth reached by the plants.

3. What kind of crop is the manure intended to benefit?

All crops must have nitrogen, potash, and phosphates; but some naturally require a preponderance of nitrogen in their food, while others require more potash or phosphates. Corn crops and grass are benefited by having a considerable amount of nitrogen; leguminous crops (for example, beans, peas, vetches, clover, saintfoin) and potatoes need more potash for perfect growth; and phosphates are of especial use to roots.

These points must be specially considered when making up mixtures or compounding complete manures suitable for turnips, potatoes, and other crops.

4. What is the state of the ground as regards the three plant-foods in it? Does it contain an ample supply of all three? Is it exhausted of all three, or is it deficient in only one or two of them?

In ordinary farm practice potash wastes little, and clay soil contains much, so that in this latter case potash is rarely necessary, except for very special purposes.

#### KINDS OF MANURES.

Artificial manures may be divided into three distinct classes according as they entirely or very largely contain nitrogen, potash, or phosphates, and one class cannot take the place of another. I will now mention some

characteristics of each class, and point out the composition of the leading examples based upon the foregoing considerations.

—MANURES CONTAINING NITROGEN OR NITROGENOUS MANURES.

Such as it is needed, we possess at the present time very precise knowledge as to the work carried on inside the plant by the different ingredients of plant-food, or of the influence which each constituent has upon the growth and development of the plant, though the general effect of some of them is not known.

Nitrogen always tends to make the green parts of plants—leaves and stems—grow vigorously and luxuriantly, rank growth is promoted, and the ripening and maturing of the green parts of plants is retarded or stopped. The nitrogenous manures are therefore of use in increasing the growth of crops which are cultivated for their leaves and succulent parts, in cases of backward growth, or where early vigorous development is necessary.

Leguminous crops, such as peas, beans, clover, lucerne, and vetch, are able to obtain sufficient nitrogen from the air to supply all their needs, whereas other crops cannot do so, to any noteworthy extent, even if at all. In manuring leguminous crops, therefore, the amount of nitrogen need be but small.

All crops must produce leaves and green parts before they can utilise the manures they obtain later in the season to build up seeds, nitrogenous manures, if used at all, should be applied during the early growth of the plant—in the spring—not at the end. To apply nitrogenous manures—say to wheat when it is about ripe—would be foolish.

The two chief nitrogenous artificial manures are nitrate of ammonia and sulphate of ammonia. They contain the same food element, and one can consequently be used in place of the other; their peculiarities and differences as given below helping to decide which is best under particular circumstances.

*Nitrate of Soda.*—1. Contains only *one* ingredient necessary for plants, viz., nitrogen, so when applied by itself on poor or exhausted soil it can give no result.

If the ground contains potash and phosphates in sufficient quantity for a crop, or if manures containing these ingredients are used at the same time, an addition of nitrate of soda is of special service in promoting the growth of all cereals (wheat, barley, and oats), grasses, and fodder crops generally; cabbages, kohlrabi, and mangolds.

In meadow land it aids the naturally strong growing grasses

by stimulating them to form larger stems and leaves, and tends to choke out the finer grasses. If, however, potash and phosphates are present, or applied in reasonable amount, nitrate tends to increase the bulk without seriously damaging the quality of the hay.

3. The commercial samples are not pure, but should be guaranteed to contain at least 95 per cent. of nitrate of soda or  $15\frac{1}{2}$  to 16 per cent. of pure nitrogen.

4. It is very soluble, is rapidly taken up by the roots of plants if growth is proceeding, but otherwise works through the soil and is lost. It is, therefore, useless when applied to bare fallow, and is always used as a top-dressing to crops actually growing. Its easy solubility makes it useful in dry seasons.

5. It must not be mixed with a "superphosphate."

6. The amount used should never exceed 4 cwt., the usual quantity being from  $\frac{1}{2}$  to  $1\frac{1}{2}$  cwt. per acre. A given quantity if applied in two or three small dressings, gives better results than the same amount used all at once.

*Sulphate of Ammonia.*—1. See paragraph 1 in nitrate above.

2. See paragraph 2.

3. The commercial samples should be guaranteed "pure," and should contain not less than  $19\frac{1}{2}$  per cent. of nitrogen, 24 per cent. of "ammonia."

4. Soluble, but does not readily wash out of the ground. It undergoes change in the soil before it is largely taken in or used by plants, and as this change takes time it is not so quick in action as nitrate of soda.

It can be applied earlier than nitrate—even in autumn without much loss from the action of winter rains.

In wet seasons it does better than nitrate, as it is not easily washed out of the soil.

5. It can be mixed with "superphosphate."

6. As it contains more nitrogen per cwt. than nitrate a slightly smaller amount will suffice.

The amount most frequently used is about  $1\frac{1}{2}$  cwt. per acre.

## B.—MANURES CONTAINING PHOSPHATES.

The general influence of phosphates upon plants is not so well known as that of nitrogen, but it is quite different from that of the latter substance, being apparently closely connected with the production of seeds, and the ripening and maturing processes going on in various parts of plants. Early ripening of crops and improvement in quality are seen when this class of manure is used. Phosphates are of use to all crops, and especially to turnips, swedes, and barley, when applied



the form called superphosphate. All phosphates act in the same way—that is, they chiefly supply but one ingredient of plant-food—and one can be used in place of another after bearing in mind the individual peculiarities of each as given below, but they cannot be used instead of nitrogenous manures.

The chief representatives of this class are raw bones, bone-meal, or bone-dust, boiled bones, bone-ash, superphosphates of different kinds (including dissolved bone), and basic slag, or Thomas' slag. All these manures contain phosphates, but the latter are not all alike, some being known as "soluble phosphates," others as "insoluble phosphates."

#### a. CONTAINING INSOLUBLE PHOSPHATES.

*Bones and Bone-meal.*—1. *Bones* in a raw state contain an insoluble phosphate, and a certain amount of nitrogen as well. Therefore, in a soil deficient in either of these two ingredients they would act, but not on one deficient in potash.

2. Of use upon root crops and grass land generally.

3. Samples should contain at least 45 per cent. of insoluble phosphate, and not less than  $3\frac{1}{2}$  per cent. of nitrogen.

4. The phosphate in raw bone is the insoluble variety, and consequently this manure acts slowly.

It may be made to act a little more quickly by fine grinding into bone-meal, but in any case it must be applied to the soil some time before it can be expected to produce any effect. Bones are said to have most effect on soils of a light nature, least on stiff clays. Recent experiments, however, indicate that bones never give as good a result as other kinds of phosphatic manure, in spite of the general belief in their usefulness.

5. Can be mixed with any other manure.

6. The amount generally used is from 6 to 10 cwt. per acre.

*Boiled Bones and Steamed Bones* act in the same way as above, the only practical difference is that there is less nitrogen ( $1\frac{1}{2}$  per cent.) in these than raw bones, and more insoluble phosphate (55 to 65 per cent.).

*Basic Slag.*—1. Contains only insoluble phosphate, no nitrogen or potash.

It contains, however, a considerable amount of lime, which makes it of special use on soils that are either poor in lime or of a sour nature; peaty moorland and pastures are benefited by the lime it contains.

2. By reason of its containing phosphate it is very useful for turnips and swedes; also grass land generally.

3. The phosphate in it is insoluble, hence to be effective it

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must be ground to a very fine powder. In any case it is a *slow* acting manure, and must be applied early.

4. Must not be mixed with sulphate of ammonia.

5. The amount used varies from 5 to 10 cwt. per acre sown broadcast.

Some slags on the market are absolutely useless, for they contain no phosphate at all.

### b. CONTAINING SOLUBLE AS WELL AS INSOLUBLE PHOSPHATES.

*Dissolved Bones.* — 1. Raw bones contain nitrogen and phosphate, both in an insoluble or slow-acting condition; however, on treating the bones with "oil of vitriol" (sulphuric acid), these constituents become more active, much of the phosphate being changed into a soluble form.

2. Dissolved bones should be guaranteed to be "*made from raw bones and acid only*," as the lower priced steamed or boiled bones containing very little nitrogen are often used.

3. Amount generally used is 3 or 4 cwt. per acre.

*Superphosphates.* — Other substances containing insoluble phosphates can be treated with acid, and a soluble phosphate prepared, the resulting substance or manure being then known as a superphosphate. Various minerals, bone-ash, and guano containing much phosphate, are the substances generally employed in their manufacture.

1. These superphosphates contain the same soluble and insoluble phosphates as dissolved bones, but no nitrogen.

2. They are especially useful for turnips, swedes, and barley but nearly all crops are benefited by their use.

3. They should contain at least 25–28 per cent. of soluble phosphate.

4. Give best results upon soils containing a fair supply of lime.

It is absolutely essential that the farmer should know what he is buying when dealing with manures containing phosphates as there are so many openings for fraud in connection with them. He should avoid paying high prices for substances to which the name "bone" is attached, and incline more to superphosphates and basic slag.

### c. MANURES SUPPLYING POTASH.

Potash is the least important of the three principal plant foods, although plants will not grow without it. It is, however, of least practical value, because ordinarily it is not taken up by the farm so completely as nitrogen or phosphates. Much

ken out of the ground by crops comes back in the d manure produced. It is often present in considerable in the soil naturally, thus clay soils rarely need it as a ressing, but on light, sandy, and reclaimed peaty ground urns are produced by an application of potash manures. e of especial value to leguminous crops and potatoes. h, like phosphates, promotes the early maturing and duction of plants.

hief artificial manures containing it are kainit, sulphate h, and muriate of potash.

it.—The active substance in kainit is a sulphate of of which not less than 23 per cent. should be present. ntains a considerable amount of ordinary common salt, nds to make it unsuitable to some crops.

ate of Potash is a purer, more concentrated manure than lthough the useful ingredient in it is the same.

mercial samples should contain over 50 per cent. of phate of potash, that is more than twice as much as in The amount used is generally  $1\frac{1}{2}$  cwt. per acre.

ate of Potash is a more concentrated form of potash than either of the above-mentioned, and must, there- applied in smaller quantities. The amount generally  $\frac{1}{2}$  to 1 cwt. per acre.

viously mentioned, the farmer should obtain the analysis res he uses, in order to learn what ingredients they and how much of each. Such knowledge would always ise in indicating the purpose to which the manure put in the growth of various crops. The nature and of the plant-food substances in a manure are also a to the reasonableness, or otherwise, of the price asked hen compared with that of others containing the same nts; but to compare manures accurately and completely h another in this respect, demands a more technical ailed knowledge of chemical science than the farmer expected to possess. Although it is not an analyst's o fix the price of a manure, he will generally report the price asked is a fair one, and, where considerable e being expended on manures, it is advisable to obtain upon the matter, in order to avoid unnecessary expense, guard against imposition.

#### SINGLE ARTIFICIALS AND MIXTURES.

e foregoing account has been understood, it will be seen ; artificial manure by itself can be of use only when the edient which it contains is missing or deficient in the

ground. Superphosphate, for example, can only be used by itself when phosphates are wanting in the ground, and nitrate of soda only when there is a deficiency of soluble nitrogen. That such a deficiency exists can only be satisfactorily determined by actual experiments or trials: that is, by growing crops, and noting the effects produced by leaving out or adding extra quantities of the various manures. Our knowledge of plant life and of the chemical composition of the soil is at present not sufficiently advanced to enable us to determine precisely, except in very special cases, when the ground is so wanting in particular ingredients as to affect the growth of crops. Living plants or crops draw distinctions between soils and manures, which the chemistry of to-day fails to do. There is nothing therefore of such practical value as well-devised trials of the various manures and their mixtures by the farmer on his own fields. Having narrow strips of ground manured in various ways, or unmanured altogether, will enable him to gain a knowledge, which cannot be obtained in any other way, of the soil-requirements and of the use and effects of plant-foods. It is very necessary, however, that manuring and experimenting should not be carried on thoughtlessly. There should always be a definite object in view, and the greatest care should be taken to see that the trials are carefully made, or they may be seriously misleading and worse than useless. As the eye is so easily deceived, weighing the produce in all doubtful cases is essential, and, when dealing with grass land, not only the yield, but also the variations in the kind of herbage produced—which plants are suppressed and which encouraged, and the character and growth of the aftermath in the cases of mown ground—must be carefully observed.

Although artificial manures may occasionally be used singly with benefit, it is chiefly in the form of well-proportioned mixtures that they are of the greatest practical value. Where farmyard and other natural manures run short, properly compounded mixtures of "artificials" can be used to supplement them, or to take their place entirely, and it is in such cases that there is most scope for their satisfactory employment.

In making up these mixtures, apart from their cost, we must always bear in mind that the ground must be well supplied with the three substances—nitrogen, phosphates, and potash. We then have a considerable number of artificial manures containing these substances to select from. In compounding mixtures it is advisable to have slow and quick-acting manures blended together, the latter being in greater amount generally. Which to use in particular cases depends upon matters previously mentioned—quickness or slowness of action, suitability

strength or amount of active ingredients present,

as we are growing potatoes. If 10 to 15 tons of farmyard manure are used, nitrogen, phosphates, and potash will all be added to the ground; but, to produce a full crop, it will be necessary to add more of the ingredients known to specially benefit potatoes, viz., phosphates and potash. This can best be done by the use of artificials, say, 1 cwt. of superphosphate, and 1 cwt. of muriate or sulphate of potash. Where no farmyard manure is used, the following would in most instances take the place of it: 3 cwt. of superphosphate (quick-acting) and 1½ cwt. of bone-meal (slow-acting) to supply the phosphate necessary for the crop; ¾ cwt. of nitrate of soda to supply the nitrogen, and 1 cwt. of kainit to supply the potash.

For a crop of wheat—gold—a crop requiring a special supply of nitrogen—where no farmyard manure is used, an extra cwt. of nitrate of soda (in two lots), and 2 cwt. of superphosphate would be of great service. Without farmyard manure, the following mixture would take the place of it: 3 cwt. superphosphate, 1 cwt. bone-meal, and 1½ cwt. of kainit.

For a crop of oats—which require little nitrogen and much phosphate—where farmyard manure is used, 1 cwt. of superphosphate, and 1 cwt. of sulphate of potash would be of great service. Without farmyard manure, the following mixture would take its place: 2 cwt. superphosphate, 1 cwt. of sulphate of potash, and 1 cwt. of sulphate of soda. This mixture contains all three essential ingredients. For a top-dressing of 1½ cwt. superphosphate and ¾ cwt. of nitrate of soda, and 2 cwt. superphosphate and ¾ cwt. nitrate of soda are rapidly growing barley are often very useful.

The above examples are sufficient for the purpose of indicating the nature of the mixtures which can be compounded. I must, however, anxiously avoid giving any cut-and-dried list of the artificial manures to use for particular crops: first, because the nature of the soil, climate, method of farming, and a hundred other things make it almost impossible to do more especially, because such a list would encourage hasty methods, and discourage that wise forethought which is so necessary for real progress.

The present article has succeeded in giving, with a minimum of technical terms, a tolerably simple account of the nature of artificial manures and its direct action as a food upon crops, such as wheat, and the indiscriminate use of artificial manures, and we trust will stimulate all to “work and learn,” my object having been attained.

### III.—*Live Stock and British Farming.* By A. J. STANTON.

NOT so very long since the British farmer was told that, in consequence of the diminishing quantity of agricultural profit on corn-growing, he must give the greater part of his attention to the breeding of live stock and the supply of meat for the British people. Still later, he was advised to renounce, to some extent, stock feeding, and to devote all his energies to the production of milk, butter, and cheese. The farmer, notwithstanding the fact that he is charged with being unwilling and slow to move, was an attentive and compliant pupil. From experience he knew that the growing of corn, especially wheat, was a long way from being profitable, and he was anxious to find a road which, like the tide of the immortal bard, "leads on to fortune." It would be too much to say that he expected to make a fortune—to realise sufficient capital to be independent of labour—but he certainly did hope and seek for the development of a series of circumstances which would enable him to pay his way and leave a comfortable margin on the right side of his banking account. To save the labour bill, arable land was turned down to pasture, but even the wisdom of doing this has latterly been questioned, and he is half-heartedly advised to grow more corn and roots for stock feeding. It should certainly pay better to feed stock on home-grown corn than to sell the latter at low prices and with the proceeds purchase other food at relatively higher rates. The cattle movement did not prove an entire success for long. It is true that for a time the British farmer appeared to be able to hold his own—that a profit seemed to be forthcoming from stock, whilst it had unmistakably disappeared from corn. But foreign competition, though it had previously existed, began to develop, and pleasing profits soon dwindled into something not far from lamentable losses. Thus another piece of the rock was knocked from the foundation of the agricultural structure. Corn was impossible—meat nearly so. What was to be done?

There was nothing of importance left, except the dairy. At that time the foreigner was, as he is now, practically feeding the people—our bread and meat came from abroad, at all events to such an extent as to induce the population to regard the British farmer and farming as of little or no importance in the economy of the nation. Why should not this industry be sacrificed on the altar of low-priced bread and meat; it does not produce all we want, and the biggest producers will give us more if we require it? The foreigner now supplies four-fifths of our bread and to grow but one fifth; the proportion of meat ma

not be so great, but yet it is enormously large. Beyond this dilemma of the farmer there was still left the opportunity of providing the butter and cheese to accompany the foreign bread, and the milk to flavour tea or coffee of foreign production. Great efforts were made in dairying, and for a time—unfortunately it was very brief—matters went on well, and there appeared to be “money in it.” Notwithstanding that the milk producers were screwed down to the lowest point by dairy companies and distributors, there was a profit, even if it was not enough to counterbalance deficiencies in other sections of the farm. The success, apparent or real, was shortlived, for the foreigner was soon in evidence with butter and cheese, and subsequently with milk and cream. Rates of carriage on railways and steamships were, as they still are, favourable to outsiders and unfavourable to native producers, and, except at odd times and under special circumstances, the dairy trade went the way of corn-growing and meat production. It may be admitted that it would have been still worse if the foreigner could have competed with the British farmer by supplying milk in summer, but it is a pleasure to know that if he sends us milk at that time of the year he loses by the transaction.

The tide has now again turned in favour of live stock, and the British farmer, having nothing else to fall back upon, is looking to it to help him through his difficulties. He does not favour the system which is known by the pretty French name of *petite culture*, which we, in English, could, with native cynicism, describe as the growth of all sorts of little odds-and-ends that might command a market if one only knew where the market was, and were able to get the produce there at the right time and at a cheap rate. Not one word would I say against this idea of variety of produce, because I know that nowhere in Britain, except in those parts only where agriculture is of a diversified character, has a living—much less a profit—of late years been made. But then too much importance must not be attached to it. There may be, also, men who have done exceedingly well by breeding pedigree animals, but they are few, necessarily the few. The point for present consideration is, can the British farmer, having lost nearly all else, hold his own by the breeding or feeding of ordinary live stock? This is a question which, at the present time, is of the utmost importance, seeing that live stock is once more being regarded with the greatest favour. The farmer, in fact, is looking to his live stock in order to live.

## LIVE STOCK OF THE UNITED KINGDOM.

It may be asked, "Is the farmer justified in expecting tion in this quarter?" This is a very natural and real question, and, in order to obtain an answer to it, we shall well to study statistics which bear on this section of our produce and wealth. It is accepted as an axiom, that an increase of trade denotes national prosperity—a decrease the reverse. The more goods we manufacture and export the more work there is at home, and the more profit is paid to our foreigner,—in the form, it may be, of other goods or food more we raise for home consumption, the more our own are employed. What has been the effect upon the live stock industry? Has it increased? Has farm stock multiplied? Have the farms of the kingdom been productive of more numbers of animals than they were formerly? Has the increase or decrease corresponded with that of population? It is hardly necessary to go back many years to draw a conclusion, and perhaps, considering the changed and changing condition of farming, it will be best to keep within two decades.

The following table gives the number of cattle, sheep, and pigs, on the farms of the United Kingdom, in the years 1876-1895:—

TABLE I.—NUMBER OF LIVE STOCK IN THE UNITED KINGDOM.

| Year.                        | Cattle.    | Sheep.     | Pigs.     |
|------------------------------|------------|------------|-----------|
|                              | No.        | No.        |           |
| 1876 .. .. .                 | 9,995,028  | 32,262,579 | 3,711,100 |
| 1877 .. .. .                 | 9,731,537  | 32,220,067 | 3,911,100 |
| 1878 .. .. .                 | 9,761,288  | 32,571,018 | 3,711,100 |
| 1879 .. .. .                 | 9,961,536  | 32,237,958 | 3,111,100 |
| 1880 .. .. .                 | 9,871,153  | 30,239,620 | 2,811,100 |
| 1881 .. .. .                 | 9,905,013  | 27,896,273 | 3,111,100 |
| 1882 .. .. .                 | 9,832,417  | 27,448,220 | 3,911,100 |
| 1883 .. .. .                 | 10,097,943 | 28,347,560 | 3,911,100 |
| 1884 .. .. .                 | 10,422,762 | 29,176,787 | 3,911,100 |
| 1885 .. .. .                 | 10,808,760 | 30,186,200 | 3,611,100 |
| 1886 .. .. .                 | 10,872,811 | 28,555,240 | 3,411,100 |
| 1887 .. .. .                 | 10,639,960 | 29,401,750 | 3,711,100 |
| 1888 .. .. .                 | 10,268,600 | 28,938,716 | 3,811,100 |
| 1889 .. .. .                 | 10,272,765 | 29,484,774 | 3,911,100 |
| 1890 .. .. .                 | 10,789,858 | 31,667,195 | 4,311,100 |
| 1891 .. .. .                 | 11,343,686 | 33,533,988 | 4,211,100 |
| 1892 .. .. .                 | 11,519,417 | 33,642,808 | 3,211,100 |
| 1893 .. .. .                 | 11,207,554 | 31,774,824 | 3,211,100 |
| 1894 .. .. .                 | 10,780,796 | 30,037,818 | 3,711,100 |
| 1895 .. .. .                 | 10,753,314 | 29,774,853 | 4,211,100 |
| Average, 20 years            | 10,444,810 | 30,494,912 | 3,711,100 |
| Average, 10 years 1886-95 .. | 10,844,876 | 30,721,197 | 3,811,100 |



The foregoing table will, I think, be found not only interesting but immensely suggestive. For instance, it emphasises the view that there has been no very remarkable difference in the number of live stock during the last twenty years. The question whether the stock is of more or less value will be discussed subsequently. Within the period indicated, cattle have fluctuated by just over  $1\frac{3}{4}$  million head, or about 18 per cent.; i.e. from less than 10 millions in 1877 to upwards of  $11\frac{1}{4}$  millions in 1892, when the climax was reached. From that year until the present a decline has been going on, and in June last we had on the farms of this country slightly over  $10\frac{3}{4}$  millions of cattle of all ages, or three-quarters of a million more than in the first year quoted. The present year's figures, however, take a position about midway between the average of twenty years and the average of the last ten. There has been no continuous expansion, consequently no growth of prosperity. In three years only (1891-2-3) did the numbers exceed 11 millions, and, so far as an opinion can be formed, that total may not be found to have been exceeded when the cattle census is again taken, although it must be admitted that there are better prospects this year of our herds being increased than there were twelve months or two years ago. Now if we bring into juxtaposition three simple sets of figures, we shall see with the utmost clearness how matters stand—whether or not our live-stock industry has increased in the way it has often been supposed to have done. In June last, the number of cattle was 10,753,314; the average of the last ten years is 10,844,876; and the average of the last twenty is 10,444,810. The respective differences will be found very insignificant—a *minus* quantity of 91,562 on comparison with the ten years' average, and a *plus* quantity of 308,504 on the twenty years' average.

It cannot be admitted, therefore, that the production of live stock has been largely extended in the United Kingdom; that the business of cattle-raising is, or has been, growing in prosperity. An advance for two or three years, succeeded by decline, does not represent what ought to have been done if the industry were really expansive. But it was evidently all the farmer found it possible to accomplish. Increase of stock represents increase of capital, but it is a well-known fact that the aggregate capital in our farms is less than it formerly was. Therefore, the recent decline on the head of stock indicates the withdrawal of capital, or, in the majority of cases, its total disappearance. Judging from this solitary stand-point, the farmers' capital cannot be said to have earned much profit in the twenty years under notice. Hence the depression and poverty.

## INCREASE IN DAIRY CATTLE.

A change, which is worthy of note, is apparently taking place, although slowly, in the character of our herds. A study of the Government Returns will reveal the fact that the cattle which are ostensibly for consumption as food are declining in numbers, whilst those kept for dairy purposes are increasing. Animals above two years old are 160,848 fewer than they were in 1894, and animals between one and two years old, 29,768 less in number. There is, however, an increase of calves to the extent of 151,030. The change in the number of cows and heifers, in-milk or in-calf, is worth more than passing notice. On the year there has been an increase in this class of cattle of 12,034, which, of course, indicates an expansion of the dairy trade, but it is not very much, amounting to no more than .3 per cent. Nevertheless, it unmistakably shows that the practice of milk-selling or dairying has grown, notwithstanding the fierceness of competition and the low prices of milk, butter, and cheese.

## SELLING VALUE OF STOCK.

The figures above given indicate clearly that the farmers of the United Kingdom have not become rich by increasing the number of their cattle. Where, then, can an advantage be found? There are only two sources whence can flow the bright waters of prosperity. One is the selling value of the stock, and the other the lesser cost of the material used for feeding and fattening. There is no gainsaying that, generally speaking, the farmer has had the advantage of low-priced feeding-stuffs, which would have been of more importance if he had possessed the available cash with which to purchase stock to consume them. Unfortunately, this has not been the case, or it would have been manifested by an increase in the number of animals raised or bought for feeding purposes. It will be well now to give the rates for live stock which prevailed in the twenty years previously referred to; the Metropolitan Market being taken as fairly representative of the United Kingdom.

## GREAT FALL IN PRICES.

The first thing that will strike the reader in the following table is the great fall in value which has taken place in cattle during the last twenty years. It should be noticed that these figures extend only to 1893, being those given in the Agricultural Returns for last year, the figures for 1894 not having yet been published by the Department. However, I believe it will

TABLE II.—WHOLESALE PRICES OF BRITISH CATTLE IN THE METROPOLITAN MARKET.

| Year.   | Cattle.    |        | Sheep.     |         | Pigs.      |        |
|---------|------------|--------|------------|---------|------------|--------|
|         | per 8 lbs. |        | per 8 lbs. |         | per 8 lbs. |        |
|         | s. d.      | s. d.  | s. d.      | s. d.   | s. d.      | s. d.  |
| .. ..   | 3 10       | to 6 2 | 5 2        | to 6 11 | 4 4        | to 5 5 |
| .. ..   | 4 4        | " 6 0  | 5 5        | " 7 0   | 4 6        | " 5 8  |
| .. ..   | 4 6        | " 5 11 | 5 6        | " 6 11  | 3 10       | " 4 11 |
| .. ..   | 4 6        | " 6 0  | 5 4        | " 6 10  | 3 10       | " 4 10 |
| .. ..   | 4 1        | " 5 6  | 5 5        | " 6 7   | 3 9        | " 4 8  |
| .. ..   | 4 6        | " 5 11 | 5 6        | " 6 10  | 4 1        | " 5 3  |
| .. ..   | 4 5        | " 5 6  | 5 8        | " 6 9   | 4 6        | " 5 4  |
| .. ..   | 4 4        | " 6 0  | 6 1        | " 7 2   | 4 3        | " 5 0  |
| .. ..   | 4 4        | " 6 1  | 6 2        | " 7 3   | 4 0        | " 4 9  |
| .. ..   | 4 1        | " 5 9  | 5 6        | " 6 5   | 3 8        | " 4 7  |
| .. ..   | 3 11       | " 5 3  | 4 6        | " 5 8   | 3 3        | " 4 3  |
| .. ..   | 3 3        | " 4 10 | 4 2        | " 6 0   | 2 6        | " 4 6  |
| .. ..   | 3 0        | " 4 5  | 3 7        | " 5 3   | 2 5        | " 4 4  |
| .. ..   | 2 4        | " 4 11 | 3 3        | " 5 10  | 2 5        | " 4 1  |
| .. ..   | 2 4        | " 4 10 | 3 6        | " 6 4   | 2 6        | " 4 5  |
| .. ..   | 2 4        | " 4 10 | 4 6        | " 6 3   | 2 5        | " 4 1  |
| .. ..   | 2 9        | " 4 11 | 3 9        | " 5 10  | ..         | ..     |
| .. ..   | 2 11       | " 4 9  | 3 9        | " 5 7   | ..         | ..     |
| .. ..   | 2 10       | " 4 9  | 3 8        | " 5 5   | ..         | ..     |
| 8-80 .. | 4 5        | " 5 10 | 5 5        | " 6 10  | 4 0        | " 5 1  |
| 1-85 .. | 4 3        | " 5 9  | 5 7        | " 6 8   | 3 11       | " 4 9  |
| 6-90 .. | 2 8        | " 4 9  | 3 10       | " 5 11  | 2 5        | " 4 3  |
| 1-93 .. | 2 10       | " 4 10 | 3 9        | " 5 7   | ..         | ..     |

and that, if there is any alteration at all, its only effect is to still further emphasise the unsatisfactory position of the live-stock trade. In the twenty years' period the range for inferior cattle has been from 4s. 6d. to 2s. 4d. per 8 lbs.; the range for sheep in 1877, 1878, and 1880, and the latter in the years 1889-90. The price in 1875 was 3s. 10d. per 8 lbs., and in the last of our comparisons, it was 2s. 10d., a drop of 1s. 10d. per 8 lbs., or 1½d. per lb. (26 per cent.). If, for comparison's sake, we take the fall from 3s. 10d. to 2s. 4d., we find a drop of 1s. 6d. per 8 lbs., or 2d. per lb. (or just over 39 per cent.); if, further, we compare the highest with the lowest figure in the twenty years, there is the difference in inferior cattle of 3½d. per lb. (or over 48 per cent.). In first quality, the fall has not been quite so much, from 6s. 2d. to 4s. 9d., or 2½d. per lb. (nearly 23 per cent.). In three years the British farmer was selling cattle (inferior, but true) at the ruinously low price of 3½d. per lb., and though it has since risen ¾d. per lb., can it be urged for one moment that such trade is profitable? He could get at the best times 6½d. per lb. for the best; but how much of it was of quality? Feeders of stock will tell us that cattle will not

pay any profit if they are sold at less than from 4s. 5d. to 5s. 9d. per 8 lbs., whilst others most positively assert that they get no direct profit at all from the feeding and sale of stock, and that the profit accrues through the manure and the consequent enrichment of the land. It is difficult, however, to see how profit can come this way, when most of the crops are alleged to cost more to produce than they realise, and I cannot accept this view as representing general experience.

It will be noticed that there is a wide margin between the figures which are said to be required to cover the cost of production; but perhaps it is not very far from the truth, as both farms and farmers vary in their ability to raise cattle, and consequently will require or expend more or less in getting stock ready for market. The feeder who cannot finish off his cattle ready for the butcher at less than 5s. 9d. per 8 lbs. (assuming that a moderate profit is included in this quotation), must, except as regards the manure, be a great loser, even if all his animals are of first quality and command the top price. Neither must the man who can manage to squeeze a profit out of 4s. 5d. per stone let his beasts go into the market a little short of the best, as second quality does not touch that figure. Of the inferior class little need be said, for scant attention should be given to them. They consist of old cows, bulls, and wasters, which good feeders are glad to be rid of. At periods when shortness of food compels farmers to sacrifice unfinished animals, or the exigencies of rent and other outgoings demand attention at any cost, better stock would have to be treated as inferior.

#### BEST STOCK THE MOST PROFITABLE.

There is one self-evident and striking fact before us, which the foregoing figures prove, that in first-class stock only is there a profit to be made, and the advice persistently given to raise only the best, whether it be of meat, cheese, butter, barley, or any other agricultural produce, is both sound and safe, in spite of the fact that the greatest fall has been in best cattle. It is, however, well known that the second-rate and inferior meats, that which experiences the fiercest competition from foreign imports; the second quality perhaps suffers in the severest degree, the best foreign being employed to push it aside, whilst occasionally, through the duplicity of the butcher, it also ousts the best English. Everything should be done to put upon the market such meat as will defy outside competition, for in no other way can a British feeder do any good for himself. It is undoubted that the foreigner has been placing upon the British market cattle of much improved breeding and finish, the resul

revious importations of sires and stock of our best meat-lucing breeds. The following short table, compiled from a set of figures given by the Board of Agriculture, affords an illustration of this point. It shows an improvement in the value per head of cattle landed on our shores, but it cannot be said that the rate per lb. of the meat is better now than it was years ago. Rather is it the reverse; for foreign meat has risen in any way considerably, in consequence of a plentiful supply and demand perhaps less extensive than might have been expected, if it had not been for bad trade and the consequent diminution of the spending power of the people.

TABLE III.—NUMBER, TOTAL VALUE, AND AVERAGE VALUE PER HEAD OF IMPORTED LIVE CATTLE.

| Year. | Head of Cattle. | Total Value. | Per Head. |    |    |
|-------|-----------------|--------------|-----------|----|----|
|       | No.             | £            | £         | s. | d. |
| 1884  | 425,507         | 8,271,020    | 19        | 8  | 9  |
| 1885  | 373,078         | 7,046,477    | 18        | 17 | 9  |
| 1886  | 319,622         | 5,068,846    | 15        | 17 | 2  |
| 1887  | 295,961         | 4,438,785    | 14        | 19 | 11 |
| 1888  | 377,088         | 5,912,361    | 15        | 13 | 7  |
| 1889  | 555,222         | 9,069,327    | 16        | 6  | 8  |
| 1890  | 642,596         | 10,505,525   | 16        | 6  | 11 |
| 1891  | 507,407         | 8,581,574    | 16        | 18 | 3  |
| 1892  | 502,237         | 9,224,011    | 18        | 7  | 4  |
| 1893  | 310,045         | 6,262,761    | 18        | 8  | 4  |

knowing the large extent to which the British people depend on foreign meat, the above figures may appear somewhat surprising. The supply has fallen off by nearly one-half, when a comparison is made of the figures of 1893, and of those of 1890, the highest of the period. This diminution is due to the collapse of the dead-meat trade, and to a discontinuance of the introduction of live animals in consequence of disease abroad. It may be remarked that 1884 was the terminal year of the higher range of meat prices than have since prevailed.

#### IMPROVED QUALITY OF IMPORTED CATTLE.

Since the year 1887 the value of imported cattle has been continually increasing, and there was a considerable rise in 1892.

This shows that the imported beasts are individually worth more money, and that the trade in them, except in so far as mere numbers are concerned, has not deteriorated. The improvement is partly the result of what is believed to be a more constant and economical mode of transit. Whether this class of stock reaches us alive or dead, the American producers

fully realise the necessity of sending high-quality meat, they are to retain their trade in the face of Argentine, Australasian competition; indeed, as it was forcibly expressed the other day in one of the United States live-stock journals, Great Britain will not consent to be the dumping ground for any inferior stuff it is thought convenient to ship. This view is also emphasised by the energy which has been displayed in building and running suitably-arranged cattle sheds which permit the animals to be shipped and unshipped in remarkably short space of time, and in which they suffer least discomfort possible on a journey which must necessarily have its difficulties and drawbacks. There are persons concerned in the trade who declare that the animals are often in better condition at landing than when they were shipped, a statement which I should be reluctant to admit knowing what a sea voyage is, and what the animals must undergo. I know, too, how a long cold railway journey will affect cattle, and it is not to be expected that ten or fourteen days on the ocean will be a more satisfactory and less trying ordeal. But this question of relative advantages of live-stock or dead-meat importations need not be discussed now; our opponents are ready to follow one or other method, or both, so long as they can find a market for hundreds of thousands of cattle which are being annually raised on their vast prairie lands.

#### COMPARATIVE DECLINE OF CORN AND MEAT.

The general view held for some years has been that decline in the value of corn and meat has been relatively such as to throw the former out of consideration, and to attract attention to the latter only worthy of notice. It will be interesting, therefore, to see how this opinion is borne out by facts. The result of the inquiry will be in some measure helpful in bringing about a decision as to future action, though what has taken place in the past must, of course, be regarded as settled in one direction or another by the possibilities of coming days. It will have been seen, from the foregoing remarks, that cattle have in twenty years fallen 47 per cent. for inferior, and 23 per cent. for first quality; sheep have receded 47 per cent. for inferior and 27 per cent. for best quality; and pigs have gone back 46 per cent. for inferior and nearly 28 per cent. for best quality. These fluctuations between the highest and lowest figures of the two decades are summarised in the years 1875-93. It may be noted that with the exception, viz., in 1887, the value of the best cattle is higher than during the whole period. It is the same with sheep.

were also 2*d.* lower in that year than they are now. are shown at their lowest ebb with the 1891 figures, rest given in the official returns, in consequence of fever-ting swine being taken into the Metropolitan Market. we turn to corn prices, we find that wheat has fallen in me period no less than 59·7 per cent.; barley, 39 per and oats, 43·3 per cent. The annexed table will more show the respective decline:—

IV.—PERCENTAGE FALL IN AVERAGE VALUE OF CORN AND MEAT IN 20 YEARS.

| Meat. |    |    |                | Corn.  |    |    |                 |
|-------|----|----|----------------|--------|----|----|-----------------|
| ..    | .. | .. | 35·5 per cent. | Wheat  | .. | .. | 59·7 per cent.. |
| ..    | .. | .. | 37·0 „         | Barley | .. | .. | 39·0 „          |
| ..    | .. | .. | 37·0 „         | Oats   | .. | .. | 43·3 „          |

these figures in front of us, we may proceed to discuss r any profit can be made out of either meat or corn. growers, when they can raise grain of good quality, do nplain that it does not pay, and it is common know- at oats have the reputation of doing more for the farmer y other white straw crops, notwithstanding that prices remarkably low. Wheat admittedly is out of the question ofit-maker. Then what of the meat? First, it would be compare the relative changes in manures and feeding n order to see whether the disparity between horn and counterbalanced by the differences in values of the as, generally speaking, they also have depreciated:—

V.—PRICES PER TON OF MANURES AND FEEDING STUFFS IN THE YEARS 1875, '85, '95.

|                    | 1895. |    |    | 1885. |    |    | 1875. |    |    |
|--------------------|-------|----|----|-------|----|----|-------|----|----|
|                    | £     | s. | d. | £     | s. | d. | £     | s. | d. |
| ake .. .. .        | 6     | 15 | 0  | 7     | 15 | 0  | 10    | 10 | 0  |
| ke .. .. .         | 3     | 17 | 6  | 4     | 17 | 6  | 5     | 12 | 6  |
| e .. .. .          | 3     | 15 | 0  | 5     | 0  | 0  | 8     | 5  | 0  |
| f soda .. .. .     | 7     | 17 | 6  | 10    | 10 | 0  | 15    | 5  | 0  |
| l .. .. .          | 4     | 10 | 0  | 6     | 10 | 0  | 6     | 12 | 6  |
| .. .. .            | 2     | 7  | 6  | 2     | 0  | 0  | ..    | .. | .. |
| .. .. .            | 9     | 0  | 0  | 12    | 10 | 0  | 13    | 0  | 0  |
| of ammonia .. .. . | 9     | 5  | 0  | 11    | 0  | 0  | ..    | .. | .. |
| of cattle .. .. .  | 0     | 4  | 8  | 0     | 5  | 3  | 0     | 6  | 0  |
| of sheep .. .. .   | 0     | 5  | 10 | 0     | 5  | 8  | 0     | 7  | 0  |

An experienced stockman remarked to me the other day as feeders were contented with  $7\frac{1}{2}d.$  per lb. for beef linseed-cake was  $13l.$  per ton, maize at  $30s.$  per qr., and at  $38s.$ , they ought to be satisfied with present prices. It was in 1876 when linseed-cake fetched  $13l.$  per ton, and that was the only time it touched that high price. The point was even strongly put, viz., that they should make a profit on  $6d.$  per lb., now that cake can be purchased at  $7l.$  per ton, at  $20s.$ , and beans at  $26s.$  The current price in November was  $5\frac{3}{4}d.$  per lb. for second-rate English beasts, first quality going up to  $7d.$  If this contention is worth anything, the present range of prices for cattle should be yielding a return to the feeder. But there are few who are willing to admit the "soft impeachment" of profit-making. Of course it may be said that roots cost as much as ever they did to grow, but this is not to be wholly admitted, for there has been a falling off in the rates for artificial manures.

#### PRICES REALISED FOR IMPORTED MEAT.

The circumstances prevailing in the United Kingdom are different to those in the United States, Canada, the Argentine and Australasia, that a comparison of the mode of production will be of little profit in considering whether the outside market is likely to affect us in the future. Still, it is interesting to cite the figures at which foreign cattle and sheep can be sold, so that an idea may be formed of what they will meet. We have already quoted the price for native live stock in the Metropolitan Market, and we will now give the prices for imported beef, mutton and pork for the twelve years ending 1893, which is the last included in the Agricultural Returns.

TABLE VI.—VALUE PER CWT. OF IMPORTED BEEF, MUTTON AND PORK.

| Year. | Beef. |    |    | Mutton. |    |    | Pork. |    |    |
|-------|-------|----|----|---------|----|----|-------|----|----|
|       | £     | s. | d. | £       | s. | d. | £     | s. | d. |
| 1882  | 2     | 15 | 7  | 3       | 7  | 1  | 2     | 9  | 0  |
| 1883  | 2     | 16 | 2  | 2       | 18 | 10 | 2     | 12 | 6  |
| 1884  | 2     | 14 | 1  | 2       | 16 | 1  | 2     | 11 | 10 |
| 1885  | 2     | 11 | 11 | 2       | 11 | 10 | 2     | 12 | 5  |
| 1886  | 2     | 6  | 1  | 2       | 3  | 0  | 2     | 9  | 5  |
| 1887  | 2     | 5  | 0  | 2       | 0  | 1  | 2     | 9  | 4  |
| 1888  | 2     | 5  | 10 | 1       | 19 | 3  | 2     | 5  | 10 |
| 1889  | 2     | 3  | 8  | 2       | 2  | 0  | 2     | 8  | 11 |
| 1890  | 2     | 2  | 4  | 2       | 1  | 8  | 2     | 8  | 6  |
| 1891  | 2     | 2  | 1  | 1       | 19 | 6  | 2     | 7  | 6  |
| 1892  | 2     | 2  | 5  | 2       | 0  | 6  | 2     | 6  | 11 |
| 1893  | 2     | 2  | 4  | 1       | 19 | 3  | 2     | 10 | 0  |



## THE UNITED STATES.

On looking at the Chicago markets, which may be said to be the prices of live stock in the United States, it will be found that beef of the best quality sells for  $3\frac{1}{2}d.$  per lb. by carcass, which is very nearly the price obtained for it in Deptford and Birkenhead markets. If to this is added the weight and other charges, it will make the cost as much as, if more than, the beef will fetch here. The loss, however, is very apparent. In the first place, the figure quoted is the highest price, and applies to the best meat only, of which probably not much finds its way to England. The bulk will not approach this quantity, and a lower initial value will lend a margin of profit to business. There is also the hide, fat, and other offal to help the exporter—these possibly provide the profit even when the best are shipped. The rates which the Chicago exporters are such that both the raiser and feeder, though they often complain, can raise cattle profitably when these realise  $3\frac{1}{2}d.$  or even  $3d.$  per lb.

## AUSTRALASIA AND THE ARGENTINE.

In Australasia it is claimed that cattle sold to the exporter just over  $2d.$  per lb. for dead meat (beef) leave a fair margin of profit to the producer. If this is the case, Australasia would be able to compete with the United States and Canada. Recently, however, the Argentine has rapidly come to the front as a corn and meat exporting country, supplying no less than 35,813 head of cattle and 290,108 sheep during the eleven months ending November last. A somewhat striking instance of how one class of produce acts upon another was pointed out recently by a Buenos Aires correspondent the other day, viz., that it was a cruel irony of fate for the British farmer, the new trade in live cattle helps the wheat export, because cattle and sheep can be carried on the deck of a steamer already laden with grain, and that means reduced freight on grain." Therefore, the already-stricken British farmer has disaster piled upon disaster, his unprofitable wheat-growing being made less capable of recovery by an attack on the only other branch of his industry open to him for profit-making.\*

Can the British stock-feeder withstand the streams of cattle and sheep which flow hither from all directions? Of late, there

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This is also the case with American imports. In September last the largest cargo of food-stuffs which ever left New York arrived at Liverpool, and it comprised 750 cattle, 9,000 sheep, 3,000 quarters of beef, 1,800 cases and 1,700 boxes of bacon, 136,000 bushels of wheat, 2,000 sacks of flour, 90,000 bushels of maize, 10 bags of oil-cake, 1,000 cases of canned provisions, &c.

has been some little anxiety in the United States and at the efforts of the Argentine, in which they naturally doubt accurately discern their greatest rival. The Americans so far, have no fear of the Australasian colonists in the cattle trade, though they have felt the result of the large export of frozen meat. The United States and Canada will still be raising cattle, for they find it more profitable than grain-raising, and although we are told that the population of the United States will soon require all the food it can raise, the surplus in the meantime be sent to the United Kingdom and supplied to the European Continent as permit it to enter. The increase in the number of cattle in the States last year is probably a temporary and passing circumstance only.

A good supply of cattle weighing 1,300 lbs. and up is regularly coming forward for shipment from the Argentine to Europe, and there is likely to be no difficulty in keeping the supply at prices which have been put down at the head on board ship, the freight to Liverpool being about one or nearly double the value of the animal.\* The Argentine cannot compete with these prices, unless they can raise cattle at a lower cost than the Argentine feeders, as the freight to Europe at present well-nigh prohibitive. In both these countries there is great fluctuation in the cattle business, owing to the prevalence of drouthy seasons. In this way Australasia has suffered this year, and this has shortened the supply and consequently made shipments more difficult. It is not likely that such a fluctuation will occur all over the globe at once, and, therefore, there may be fluctuations in numbers and prices, but there will always be imports in plenty.

In the Argentine, seasons are variable, and have a great effect on cattle-feeding and raising. In proof of this, an instance may be mentioned where an estanciero bought 800 cattle at 16s. 6d. each, kept them for six months near Buenos Aires on 2,000 acres of fine land rented for 5s. per acre, and sold them for 2l. 10s. each. Two years ago, owing to a drought, it was all he could do to keep a few animals alive on the land. Some interesting particulars relating to the Argentine are given in an extract from a letter which I have received from Mr. J. J. de la Roca of Buenos Aires.†

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\* Mr. Brett, an extensive trader in cattle and sheep in the Argentine, was in his evidence before the Royal Commission on Agriculture.

† "This is an enormous country, and the raising of cattle near Buenos Aires is a very different matter to breeding them many hundred of leagues from the capital. Near town the estancias are more or less like English farms, and, as we call it, they are seldom of less than four square leagues in extent, and measure twenty or more, though it is principally on the latter that the best cattle are raised, the former's stock generally being small."

## PEDIGREE ANIMALS AND BETTER STOCK.

not cattle-feeding such as this, and with its attendant the English farmer cannot easily compete; it is therefore very for him to obtain bigger prices, by raising better

As time goes on, however, it may be more difficult to his wide difference, because every exporting country has been endeavouring to improve its live stock by the outlay of

to sell for stud purposes. I will take the life of an average bullock that he arrives alive in England. He is bought, as a rule now, in the Western and Northern Camps having been pretty well drained for being of suitable animals, although, of course, every day others are seen, and it is on the latter camp that better-bred animals are more easily found. However, just at the moment, from what I can hear, buyers of this kind are looking to the south. There these animals are bought at from 30, according to their breeding and condition; they are then taken to the alfalfa [lucerne] camps there, and when fat, which takes in about four months' time, at a cost per head of about \$12, they are sent to the exporter at an average price of \$100 paper, or \$30 gold, say six dollars, on the estancia. The cost of trooping the cattle from the camps on which they were bred to the camps on which they are to be fattened varies according to the distance, &c., but \$3 may be allowed. Besides the

I have mentioned, there are commissions and expenses of all sorts to be met by the man who makes a business of buying cattle to fatten on his estancia, buys well, and has plenty of alfalfa, is just now amassing a fortune. Thousands of bullocks are bred on inside camps, fattened on them, and then placed at three or four years old to export; but the estancia owner, by selling alfalfa, as a rule, makes it pay better to buy thin animals from the camps, bring them in and fatten them, as he could not breed sufficient for his own use, even if it paid him to do so on alfalfa camps, which are of great use for fattening all the year round. Cattle are usually sold at three or four years old. Prices, as I have said, average \$100 paper (\$30 gold) for a bullock weighing on an average 600 kilos, or 1320 lbs. Heavier animals fetch higher prices, though they are very scarce, and if too big, are not so good for the English butcher.

Animals are generally sold to the exporter by the breeder himself. Prices for cattle have risen since the export business opened, almost more than those for sheep, and a good wether can now be sold as high as \$11 or \$12 with his skin, and his hearing just now is in full swing all over the country, so prices vary very much according to whether the sheep are shorn or not. A good woolled sheep would weigh 4 kilos of wool, which, at a dollar the kilo, means \$4 (a kilo is about 2.2 lbs.).

It is very difficult to say what profit is generally made either by the breeder or the fattener of cattle or sheep. In some years the camps are so good that they can fatten many hundreds of heads, yet do no more than keep alive the stock in other years, though alfalfa camps suffer very much less in years of drought, provided there is water near enough the surface to reach this enormous roots. Then, again, just at present well-bred animals for export are none too plentiful, and so both the breeder and fattener get good returns and a satisfactory return for the large sums the former has expended in breeding bulls, and the latter in laying down his paddocks under alfalfa. In the near, of course, the stock of this country is being improved, and soon we shall have thousands of bullocks, if not pure-bred, as nearly so as to make a difference to their commercial value for the butcher. The stimulus the market has given to breeding good-class cattle has been wonderful, and good bulls, as also rams, have sold at extraordinary prices—300. bulls, for instance, have fetched 1000. here, whilst more expensive ones have sold at \$5,000, or 3000. Some good bulls bred in this country from imported parents have sold as high as \$6,000."

considerable sums of money in purchasing from the best herds and flocks of Great Britain. Throughout the United Kingdom cattle-men are being urged to wipe the scrub beast off the earth, and replace it with a graded animal. This process is well told, as indeed it has already told, on our markets. The rivalry between North and South America and Australasia is eager to secure improvement, and it is to be hoped that it may rise to a more prosperous time for pedigree cattle at home.

The number of exportation certificates granted by the Royal Horn Society to animals during the three months ending Michaelmas last makes a long and instructive list. The countries appear at present to think that they have done what is necessary to grade up their stock, many United Kingdom breeders having no hesitation in declaring that so fit pedigree animals are concerned, they are independent of the United Kingdom. The exports to Australasia are comparatively small, but this is in some measure attributed to irksome quarantine regulations. Argentina is the country which is now the best customer for pedigree animals, and is also the country which is going to deal a heavier blow than ever at the British farmer. We are teaching and helping them, as we have taught and helped others, to rob us of our industry.

#### LIVE STOCK OR DEAD MEAT.

A consideration of the prospect of live stock in Great Britain cannot be gone into thoroughly without referring to the manner in which competing food comes into this country. The following numbers of animals and quantities of meat landed during the ten months ending October 31st, 1895:

TABLE VII.—IMPORT OF LIVE CATTLE AND DEAD MEAT

|   | TEN MONTHS ENDING |                   |              |
|---|-------------------|-------------------|--------------|
|   | Oct., 1895.       | Oct., 1894.       | Oct., 1893.  |
| Cattle ..                                     | No.<br>343,796    | No.<br>419,110    | No.<br>29    |
| Sheep ..                                      | 856,176           | 386,415           | 5            |
| Pigs ..                                       | 321               | 8                 |              |
| Beef ..                                       | Cwt.<br>1,799,808 | Cwt.<br>1,771,347 | Cwt.<br>1,51 |
| Mutton ..                                     | 2,199,958         | 1,907,959         | 1,67         |
| Pork ..                                       | 210,152           | 136,692           | 13           |
| Total of dead meat (salted and fresh) .. .. . | 9,999,126         | 9,059,865         | 7,88         |

he stock and meat shipped from Ireland are not included in the above figures. Ireland is treated as a portion of the United Kingdom, the passage of its merchandise being regarded as if it were from Scotland to England or from Yorkshire to London.

#### IMPORTATION AND DISEASE.

Cattle are brought from North and South America in well-fitted ships, at what may perhaps be regarded as the *minimum* of discomfort or cruelty; but those which came from Australia a few weeks ago on badly and unsuitably-fitted ships, were subjected to conditions injurious to living animals. The transport of stock by sea cannot, at the best, be considered less than cruel, not only from the circumstances attending the conveyance, but because it is really unnecessary. When actual necessity is put forward as an excuse for a certain amount of cruelty, the pricking of conscience becomes more or less mollified. "What can't be cured must be endured" does not apply here, for the cruelty can be cured, and there is no necessity for it to be endured.

The refusal to admit live cattle into our ports, unless under special circumstances, would put an end to this cruelty. And the stoppage would have another important effect. It would prevent the introduction of cattle disease. Farmers have suffered much loss through disease in cattle, and the country has made considerable sacrifices in order to keep our herds and flocks free and uncontaminated. Millions of pounds have been expended in this way, and the mere remembrance of severe attacks of cattle plague, foot-and-mouth disease, and pleuro-pneumonia, is sufficient to make men ask for security. Then, look at our present position with regard to swine fever. Thousands of pounds have been already spent in attempts to eradicate this disease, without success.\* There is no need to discuss the question whether pleuro-pneumonia or other disease exists in exporting

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Mr. Cope, Chief Veterinary Officer of the Board of Agriculture, speaking to the Driffield Farmers' Club the other day, said:—"What has been lost to the country directly and indirectly by these diseases will never be known; but I can tell you this, that our statistics show that nearly 300,000 died, or were slaughtered here affected with cattle plague within eighteen months—that is between June 1865, and December 1866—and it is computed that they were worth £9,000L.; that over 70,000 cattle died or were slaughtered in twenty years of pleuro-pneumonia, which would be worth at least 700,000L. more; and as the losses directly and indirectly from foot-and-mouth disease, which, along with pleuro-pneumonia, had existed in this country for fifty years, are enormous injury to trade through vexatious but necessary restrictions (medically imposed), no man can estimate them. If the farmer ever has to undergo such a period again, it will really be the last straw that must break back."

countries—it is very irritating to the Americans even to hint at it—but prevention is better than cure. It is easier, too, in this instance, for if we exclude the living conduit the contamination cannot flow. The Board of Agriculture have power to exclude animals under certain circumstances—when countries do not possess a clean bill of health—and they have exercised it generally with discretion, not to say leniency. It is felt, however, that it would be better for Parliament to exact that cattle shall not be landed alive, except for immediate slaughter at the port of debarkation, and this view has been pressed upon the Minister of Agriculture. The request is reasonable, and should be complied with. It would not only remove a source of danger to our live stock, but would cause the cattle and meat trade of this country to assume a more settled character. Those who are in favour of the introduction of live stock for feeding purposes profess to be in a position of uncertainty, because they never know when an embargo which is on will be removed, or a restriction imposed when none exists. There may or may not be some ground for this; but if the proposal restores peace of mind to these troubled individuals, as well as keeps disease away from our herds and flocks, it will “a double duty contrive to pay.”

#### FROZEN OR CHILLED MEAT.

If the importation of live stock is prohibited altogether meat will come to us in a chilled or frozen condition. There is a great improvement in the appearance of this meat since the trade in it commenced; and now the chilling process has been adopted the sides look still better, and are more convenient for sale. As the Australians were obliged to freeze their cargoes the chilling of meat gave the Americans an advantage over them; but the recently-invented defrosting process is said to be so successful that it increases the value of the meat a halfpenny per pound, as compared with that sold in a naturally defrosted condition. Now if it is true, as the importers and sellers of chilled and frozen meat say, that such meat is as good as English unfrozen—which I do not for a moment admit—what ground is there for desiring the continuance of the live trade with its attendant cruelties? It is true the offal, out of which profit may or may not be made, is lost, and there is the displacement of a small amount of labour at the ports of landing. But a similar displacement caused by the introduction of flour instead of wheat has not led any British Government to refuse to admit the manufactured article, nor should it be held sufficient to justify a refusal to perpetuate cruelty, and possibly to disseminate disease.

## SHALL WE BREED OR BUY?

this question there is a difference of opinion, more pronounced than many would consider possible. The experience of many farmers—undoubtedly the majority—leads them to believe that home-raised stock are best to keep for feeding, and that out of them the most profit can be made. A section of farmers, in various parts of the kingdom, as strongly hold the contrary view; they declare that a much larger profit can be made by the feeding of stock bought for the purpose. The farmers which are the most emphatic on this point belong to the north, and they are those who were formerly able to obtain live stock from the United States and Canadian stores for finishing off. Figures have been published showing that they could make as much as one-third more profit on American-bred stock than they could if raised at home. These are certainly not the men who would be feeding cattle no advantage beyond manure. It has been said that this profit was obtained by representing that the beasts were Scotch cattle when they were subsequently sold in London. That some deception may have been practised in this direction I am inclined to believe, but I do not believe all that has been charged against Scotch feeders who are so much in vogue for Canadian stores. Designating the cattle "Scotch" would not make the meat of the quality represented.

Nevertheless, many of these beasts were sold under a misleading description, and in that way did an immense amount of injury to those who really bred and fed the animals they sent from Scotland to market.

It is best to raise stock for ourselves for more reasons than one. In the first place, it makes us less dependent on the foreigner for meat, and if the industry can be made to pay, it provides more work on the farms. There are men who hesitatingly hold that there is an advantage in feeding home-raised stock, because it is kept going from birth to maturity, and they recommend others to pursue this course; they give instances where bought cattle have not thriven so well, and have returned a smaller percentage of profit.

The question of economy between breeding or purchasing, seems to be rather a preponderance of opinion that home-raised animals cost less than those which are purchased, and, moreover, are of better quality. Probably there is not much difference either way; but, after all, it must be admitted that calves bred from good stock at home are those likely to be the quicker fatteners than rougher and coarser-bred animals brought up at markets and fairs. The Scottish feeders are not

alone in their desire to get stock from outside. In the East of England generally, there is a great liking for cattle, which certainly do well and are regarded as better payers than animals bred at home. Large numbers of cattle are sold in other parts of the country, as may be gathered from the fact that there were no less than 733,113 cattle brought to the market from Ireland in the eleven months ending November 1887. Of course, all these were not stores, but the latter probably have been half the number. With many men there is a tendency to split up the regular procedure of the farm. To grow and feed stock for the market is the natural process, but they do not like to be at the trouble to breed. They become simple buyers, leaving to others, either at home or abroad, the supply of the raw article on which they can exercise their skill in preparing it for the market. It must be admitted that the tendency of the age—to split up into sections work formerly taken as a whole.

#### SHEEP IMPORTS.

Our remarks hitherto have applied almost solely to beef, only passing reference having been made to the fact of sheep. What has been said as to the former applies with equal, if not greater, force to the latter. It will be noticed that the fall in the value of sheep (or mutton) has been even greater than in that of cattle. Enormous as the quantities of cattle and beef have been, those of sheep and mutton have been still more extensive. Of late years there have been large quantities of sheep landed in the United Kingdom; but, on the other hand, the quantities of mutton have wonderfully increased, more than made up any deficiency—the united trade has been actually extended. The following figures show the extent of the importation, 1880 being the last complete year published :—

TABLE VIII.—IMPORTATION OF SHEEP AND LAMBS.

| Year. | No.       | Year. | No.     |
|-------|-----------|-------|---------|
| 1880  | 941,121   | 1888  | 956,210 |
| 1881  | 935,144   | 1889  | 677,958 |
| 1882  | 1,124,391 | 1890  | 358,458 |
| 1883  | 1,116,115 | 1891  | 344,504 |
| 1884  | 945,042   | 1892  | 79,048  |
| 1885  | 750,886   | 1893  | 62,682  |
| 1886  | 1,038,965 | 1894  | 484,764 |
| 1887  | 971,404   |       |         |



The most striking feature in the above Table is the decrease of imports in 1892 and 1893; but that was owing to prevalence of foot-and-mouth disease among foreign sheep, and the prohibition of imports of live animals from any but clean countries. The number sprang up from 62,682 in 1893 to 484,597 in 1894, and the latter number is only half of what it was ten years ago, whilst in 1886, 1883, and 1882, there were more than a million sheep imported. Though the trade may increase again—and it has increased, as this year's figures show—whether it will ever reach that extent is uncertain, owing to the development of the chilled and frozen mutton business, and more especially if the new defrosting process is improved in the way expected.

That the British farmer has suffered more from the foreign attack on mutton than he has from the onslaught upon beef is unquestionable. Carcases of sheep can be treated with greater facility, and the meat lends itself much better to the freezing process, with the result that Australasia has been able to do as much as it pleased in its exportation of mutton, limited only by quotations in our markets. In frozen mutton, the Argentine has also had its opportunity to turn into money its immense flocks of sheep, which have been improved greatly of late from a meat consumer's point of view, and have provided more mutton than in any previous year. Holland and Germany have increased their exports, the former largely, though they must feel the effect of American and Australasian competition. Taken as a whole, and if we allow for the months of November and December an average of the previous ten months of this year, the foreign mutton trade during the last few years has grown no less than 1,075,054 cwt. The increase in 1893 was 228,935 cwt.; in 1894 it reached 291,999 cwt.; and in 1895 it may be estimated at 554,000 cwt.

Then, again, the sheep industry at home has been more briskly attacked by cargoes of live animals from Iceland, which regularly sends its consignments; in 1894 they were nearly equal to the imports of the two preceding years added together, so much has the trade developed. Canada sent 136,690 sheep in 1894, and the United States 198,138, both figures being enormous as compared with other recent years, whilst the latter country in 1895 will probably have doubled its export. So much has the foreign live-sheep trade grown, that there were no fewer than 982,267 landed in the eleven months ended November last, as compared with 484,764 in the whole of the year 1894. For purposes of comparison, the annexed table shows the imports of sheep and mutton for the years 1892–93–94, and for the eleven months ending November 1895:—

TABLE IX.—IMPORTS OF SHEEP AND MUTTON FOR 3 YEARS 1892, '93, '94.

|                         | YEAR ENDING      |                  |                  | ELEM.    |
|-------------------------|------------------|------------------|------------------|----------|
|                         | Dec., 1892.      | Dec., 1893.      | Dec., 1894.      |          |
| <b>SHEEP AND LAMBS.</b> | No.              | No.              | No.              |          |
| Denmark .. .. .         | 38,529           | 29,227           | 65,606           |          |
| Germany .. .. .         | ..               | ..               | ..               |          |
| Holland .. .. .         | 6,686            | ..               | ..               |          |
| Canada .. .. .          | 15,743           | 3,589            | 136,690          |          |
| United States .. .. .   | 2,829            | ..               | 198,138          |          |
| Argentine Republic ..   | ..               | ..               | ..               |          |
| Other Countries .. ..   | 15,261           | 29,866           | 84,330           |          |
| <b>Total .. ..</b>      | <b>79,048</b>    | <b>62,682</b>    | <b>484,764</b>   |          |
| <b>MUTTON—FRESH.</b>    | Cwt.             | Cwt.             | Cwt.             |          |
| Germany .. .. .         | 16,425           | 7,017            | 5,398            |          |
| Holland .. .. .         | 129,613          | 127,929          | 108,942          |          |
| Australasia .. .. .     | 1,040,736        | 1,213,489        | 1,424,860        | 1        |
| Argentine .. .. .       | 439,548          | 499,618          | 612,983          |          |
| Other Countries .. ..   | 52,702           | 59,906           | 447,775          |          |
| <b>Total .. ..</b>      | <b>1,679,024</b> | <b>1,907,959</b> | <b>2,199,958</b> | <b>2</b> |

## DECREASE IN SHEEP.

With the fall in prices previously shown, and the enormous imports of sheep and mutton which have been the cause of it, it would be no wonder if the sheep population of this country exhibited a severely dwindling character. The statistics demonstrate this. It shows that we have over 2½ millions less sheep in the United Kingdom than we had twenty years ago; from that time the number began to decline, and reached not quite 27½ millions in 1883, the lowest point in the last decades. Then an upward movement commenced, and the population, mounted to 33,642,808 in 1892, the highest point in twenty years. Next followed a downward course, and a further reduction, until in June last the population was 30,363,000 animals. Bad as this appears, it must not be forgotten that in the years 1881 to 1889 (with one exception, 1885), the number of sheep was lower than it is now; and it escapes notice that the present numbers are considerably below the ten years' average, and nearly three millions below the twenty years' average. If, however, we compare the last five years with the last five years of the last decade, we shall find the last five better than the last five of the last decade.

two previous fives, but worse than the first five of the twenty. Between the highest (1892) and the lowest (1882) figures there has been a variation of about 18·4 per cent.; on the twenty years' average, 1895 is lower by 2·3 per cent., but only ·87 per cent. below the 1894 figures. The result, therefore, is not so bad as it has been in cattle. This may probably be accounted for by a larger consumption of mutton, which is now said to have partly taken the place of cheese, causing the latter article to participate in the general fall of prices—especially during the past season.

#### THE FALL IN WOOL.

The price of wool has, of course, an important bearing on the profits made from the sheep flocks, notwithstanding that meat is now of more consideration than wool in the United Kingdom. At one time, in Australasia and the Argentine, as at home, almost everything turned upon the wool yield, and a sheep was bred for the weight and quality of its fleece rather than for its carcase. Now, however, most attention is directed to mutton; not that food exigencies have become more pressing than raiment, but rather because the profit to be obtained is greater on meat than on wool. Half-a-crown per lb. for the latter is but a dreamy reminiscence—a kind of a Donati comet year, in the farmers' astrology—yet it has occurred. The highest price for best fleeces in the twenty years to which we are confining our attention was 1s. 6½d. for Southdowns in 1875, and in 1894 the average was 11d., a fall of 39·7 per cent., which is more than the drop in mutton by 2·7 per cent. This was the lowest figure for best qualities, though inferior dropped down to 9d. in 1885, and stood at 10½d. in 1894. The quotation in November last for this class of wool was 11d. per lb. White Cheviot wool has also fallen, from 1s. 6d. in the early year to 13½d. (the lowest) in 1893, equal to a decline of 25 per cent. Australian wools deteriorated in price in the given period 46·1 per cent., and South African 44·7.

#### Pigs.

Only in the herds of pigs in the United Kingdom do we find matter for satisfaction. The porcine race, which is much more quickly increased or diminished than either sheep or cattle, stands out higher than it has done for the last twenty years, with two exceptions (1890 and 1891), when there were respectively 4,362,040 and 4,272,764. In the following year, 1892, pigs decreased more than a million in number, owing to a fear of fall in prices, and the consequent stoppage of breeding, and this decline continued for another twelve months.

In 1894, however, there was half a million increase, and 1895 had the credit of producing a further improvement of nearly a similar number. In June last there were 4,238,870 pigs in the United Kingdom, the averages of ten and twenty years being respectively 3,815,126 and 3,718,232.

Table II. illustrates the fluctuations in the prices of pigs, which in 1890 were at the lowest point. In the years left blank no pigs were brought for sale to the Metropolitan Market; therefore, no average of values could be taken. The prices for inferior animals have fallen progressively from 4s. 6d. in 1876 and 1881 to 2s. 5d. in 1887-88-90, a difference of 2s. 1d. per 8 lbs., or 3½d. per lb. (over 46 per cent.), whilst the top rates have dropped from 5s. 8d. in 1876 to 4s. 1d. in 1888 and 1890, equal to 1s. 7d. per 8 lbs., or 2¾d. per lb. (27·9 per cent.). The average drop is about 37 per cent. The years 1891-2-3-4 showed a further slackening of prices, and in November last the top price of pigs (which are again sold in the Metropolitan Market) was 3s. 6d. per 8 lbs., a further drop of ¾d. per lb. In the face of this serious and continued fall, it is remarkable that the number of pigs has been kept up to the point it has, but it can only be attributed to the quickness with which this stock can be bred and placed upon the market. If the profit is small, it is quickly turned over, much more rapidly than in the case of sheep, and still more so than in that of cattle. Less capital is consequently required to carry on pig-breeding, and to this may also be attributed the increase of this class of stock. Farmers are said not to like swine-breeding; but they appear to have found it necessary to follow it, though pigs have suffered more from depreciation of prices than have cattle, and quite as much as sheep.

The slight effect which the larger herds in this country have had on imports of pork and bacon may be estimated from the figures in the following table:—

TABLE X.—IMPORTS OF PIGS, PORK, BACON, AND HAMS IN 1892, '93, '94, '95.

|       | YEAR ENDING       |                   |                   | ELEVEN MONTHS<br>ENDING |
|-------|-------------------|-------------------|-------------------|-------------------------|
|       | Dec., 1892.       | Dec., 1893.       | Dec., 1894.       | Nov., 1895.             |
|       | No.<br>3,826      | No.<br>138        | No.<br>8          | No.<br>321              |
|       | Cwt.<br>3,881,378 | Cwt.<br>3,198,887 | Cwt.<br>3,716,603 | Cwt.<br>3,679,621       |
| Bacon | 1,253,132         | 988,411           | 1,129,784         | 1,184,623               |
| Pork  | 228,354           | 186,901           | 225,119           | 204,181                 |
| res.  | 132,107           | 182,091           | 180,383           | 250,094                 |

the imports of swine have been so small, owing to prohibitive landing, that they have latterly been of little account. But respect to the produce of the pig there has been an increase in every department. Striking an average of months, the year may be expected to show an increase of about 370,000 of bacon, 160,000 cwt. of hams, and 100,000 cwt. of fresh

The bulk of the latter is supplied from Holland, fully 50 per cent. In only one item is there little change, viz., pork other than hams, on which there will probably be a trifling decline.

#### CONCLUSIONS.

What are the conclusions which may be drawn from the foregoing joint consideration of the live stock of the United Kingdom and of the imports of stock and meat from the Colonies and other countries. It has not been thought necessary to tabulate the productions of the exporting nations, and their relative requirements for their own consumption, with the view to show that the increase of food cannot keep pace with the growth of population and that relief may come thence. At present it does not seem to the farmers and graziers of this country that the United Kingdom may, as has been calculated, require in the early years of the twentieth century all the food it grows for its own people; does it matter that a similar result may follow the progress of other exporting and expanding nations. It might, however, with attention, even to-day, were the United States the heart of the world which stands in the position of our food market; but with Canada, Australasia, and the Argentine included, no fear need be entertained of scarcity, at all events on the eve of the middle of the next century. As the last few years have shown, the development of these countries opens a prospect quite opposed to a reduction of imports. And may we not be still fresh fields? It is not improbable. But, whether fresh fields or not, it is certain that the food supplies from abroad will increase. Allowing for fluctuations caused by various influences, such as weather and the occurrence of epidemics, there is no ground for expecting anything but a growth of exports more steady and relatively greater than has been experienced during the last ten or twenty years. The British Government cannot entertain the slightest hope of decreasing outside competition. On the contrary, he must expect, and be prepared for, a still more vigorous assault on his industry, and probably on our own Colonies as much as from anywhere else. Our Colonies are the "dumping grounds" for the world's production; they are free to everybody, and all take advantage of them. They are the most favourable, as they are the most favoured, spots in

the world for the foreigner to sell his produce—surplus or otherwise—for he finds that he is received with open arms by a people to whom low price is a fetish.

What is the British farmer to do, with a retrospect represented by a fall in the prices of his produce from 35 to 60 per cent., and a prospect of still larger supplies being sent from abroad to undersell the only articles he can raise? Should he breed live stock, or should he relinquish it as much as possible, as he has been obliged to do grain? So far as can be seen, he must still look to his live stock to enable him to make a profit. This may be small, and it will doubtless yet be smaller, but it stands out the best among the bad. A terrible difficulty, however, faces him: he does not possess sufficient capital to enable him to raise or buy stock to feed and to bring him a profit. Before unfavourable seasons, and still worse misfortune in the shape of competition, his capital has vanished, and unless money is forthcoming from some quarter or other, it will be hopeless to look for any large permanent increase in our herds and flocks. It is his ill-fortune to have to work from hand to mouth—to do what is almost impossible—to carry on a business properly and profitably with insufficient capital. "To him that hath shall be given" applies to the British farmer without any qualification. Only to the man who has capital can there fall profit on his work; the man who has not the wherewith to buy, cannot possibly find himself in a position to sell. Still, he must do the best he can with his means, for it is of little use expecting that the Government will advance money on easy terms to farmers to help them out of the present depression. The small measures latterly suggested will not of themselves be sufficient to save the farmer, though each may be of use to a certain extent. There is something more serious the matter with the body corporate of farmers than mild remedies will cure. Deep ploughing, and not a mere scratching of the soil, is necessary, if there is to be a fruitful result. The industry has been brought to the verge of bankruptcy by low prices; many of its members have already been totally ruined, and are now striving for a bare subsistence in ways which would never have been dreamt of a generation ago, and even now will scarcely be believed.

The struggle still has to be met, and, so far as live stock is concerned, hope can be found in but one direction—the production of the very best quality of meat; for it is only on this class, as previously shown, that a profit can be made. This is the case with everything on the farm—whether grain, meat, dairy produce—there is a margin only on the highest quality which realise top prices. More efforts will have to be made

in this direction; if not, the live-stock trade in Great Britain will become as hopeless as the grain trade is already. There is but a small chance of an advance in prices under present circumstances—certainly not to an extent that can greatly affect the position of the industry. If, then, low prices, which are generally admitted to be the primary cause of the evil, are not, or cannot be, remedied by Parliamentary measures, or do not become changed through some great war or international upheaval—which many thinking and observant men believe to be not improbable in the near future—the farming industry of the United Kingdom will die out as surely as sugar refining was killed by foreign bounties. With no national reserve of food in the country, and our land out of cultivation, we certainly could not in case of war maintain a long defence against powerful naval enemies. The preservation of the farming industry is, therefore, a national concern; its neglect is a national disgrace; and it may result in national disaster if something is not done for it, and done quickly.

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IV.—*Dairying in Denmark*. By G. E. LLOYD BAKER, of Hardwicke Court, near Gloucester.

HAVING often heard it said that Denmark beat us completely in Dairy Farming, it occurred to me that it would be a good thing to take over to that country three farmers to see the best farms there, with a view of ascertaining, from personal observation, in what the agricultural superiority of the Danes consisted, and how much of their system we could adopt.

Having persuaded three experienced and intelligent men to accompany me, I started, on August 8th, from London for Copenhagen, viâ Harwich and Esbjerg. In case any of my readers wish to see Danish farming for themselves, I may say that this is the cheapest and most convenient route for those who do not mind thirty hours on the sea. A return ticket from London to Copenhagen costs only 4*l.* 0*s.* 3*d.* If much travelling is to be done, it is well to take a return ticket to Esbjerg (2*l.* 13*s.*), and a ticket for a fortnight, which will carry you over all the railways of Denmark. This latter costs 1*l.* 2*s.* 6*d.*, third class, and half as much again for second class. The money and a photograph of the person who will use the ticket must be sent a few days before starting to the Station Master, Railway Station, Esbjerg, Denmark.

I had obtained an introduction beforehand to Mr. Schou, the

able Secretary of the Danish Royal Agricultural Society kindly arranged for us to visit the chief farms. accompanied us, acting as interpreter when necessary thoroughly experienced in agriculture, he was able to p and explain much that might otherwise have escaped ou

The proprietors of the farms that we visited received hospitably, placed their carriages at our disposal, and every facility for seeing the details of their farm manage

The farms vary greatly in size, many of the larger on as much as 1,500 acres in extent ; while the peasant far from 4 to 100 acres.

The peasant occupiers are specially encouraged by ment, and a landowner is not allowed, as a rule, to am with larger ones the farms so occupied, or to let them f term than that of the life of the tenant and his wife. T farmers appear to be an industrious class ; in fact, it is hard work and the utmost frugality that they can maint position. They are useful for supplying a considerable of labour at harvest-time, as their own harvest is soon and men, women, and children are all glad to earn n working for their richer neighbours. In one instance, that the milking on a large farm was done entirely by t and daughters of the small farmers in the neighbourhoo farmers are in many cases the proprietors, nominally, farms, and many large landowners have sold small fa valuation to the tenants. The greater part of the p money is usually borrowed from the bank upon a first n and from the landowner upon a second mortgage.

Our visits were chiefly to the large farms, where i the most advanced agriculture is to be seen. Here, too, butter is made, as the small farmers, being unable to this, send all their milk to a factory.

The first farm we visited was that occupied l Fabricius, at Charlottendal, near Slagelse. This is co by one dealer at least, to produce the best butter in I t consists of 750 acres of arable land, somewhat san crops looked well, but the land is considered rather Zealand. The rent, with the taxes paid by the tenant, ust 1000*l.* for last year, or 1*l.* 6*s.* 8*d.* per acre. Abou ived rent, while the remainder varies with the price of utter, and was therefore lower than usual. All th re done by the tenant ; and the whole of the stock an ments are her property (not always the case in D Mrs. Fabricius is a widow, and, with the aid of a capab me is carrying on the farm successfully.

The farm buildings are large and handsome, and



ills for 200 cattle. There are 160 milking cows of the usual Danish breed. They are red or brown in colour, and are shaped like the Dutch cows, but are not so large, and are evidently bred entirely for milk. Some of them are provided with jackets of canvas as a protection against flies and cold. No fat calves are kept, but the old cows are fattened for a time, and are then sent to Germany to be made into sausages. During the summer the cows are all tethered on the clover. We saw them in the second crop; the first having been cut for hay. Two men are employed entirely in moving the tethered cows, which is changed five times a day, and one man's time is occupied in driving them to water; the three men fodder them in winter in the houses. The milking begins at four o'clock, morning and evening, and eight Swedish milkmaids are employed, being put one to every twenty cows of the herd; one woman can milk eighteen cows twice a day. Formerly these girls did some other work in addition to the milking, but now they refuse to do so, and are therefore occupied five hours only out of the twenty-four. A milkmaid's wages are 6*l.* 15*s.* per annum, with board and lodging, and the keep of a servant is estimated at 12*l.* per annum. The cowmen receive 11*l.* 5*s.* a year and board and lodging. The married men receive 25*l.* per annum, with a cottage and garden worth 3*l.*, and light beer and skim milk. Seventeen men and thirty horses are employed for working the land, extra hands being engaged for harvest.

The cows have hitherto calved in December, January, and February, but now there is a tendency to bring them in during April or May, as the winter price of butter is not much in advance of the summer price, and it is naturally cheaper to feed milk during summer. A great part, if not all, of the oats and barley grown is used for feeding stock; and as the wheat and rye are consumed in the house, the price of corn does not affect the farmer. Besides this, cake, chiefly rape, is bought; and the rape-seed, crushed slightly, so as to get all the oil, is also preferred, it being thought that a moderate amount of it improves the flavour of the butter. About 6 lbs. of cake per cow per day are given in winter, but none in summer. A record of the weight of milk of each cow is kept, but it is taken only once a fortnight. A large blackboard is hung in the dairy, showing the total of the milk brought in, and the amount sold for butter; the pounds of butter made, and the average weight of milk for each pound; and the amount of skim milk sold for cheese. At some farms buttermilk and carraways are added to the skim milk before it is converted into cheese. The cheese sells for about 2*d.* per lb.

At this dairy it seemed that 6,000 lbs. (English) was the

average weight of the milk annually yielded by each cow, and that 24 lbs. of milk made 1 lb. of butter. Probably, on an average throughout the country, it would take rather more, for at some places, I heard that it took 27 lbs. of milk to make 1 lb. of butter. The Swedish Alpha Separator, which separates 160 galls. per hour, is generally used; the old Danish separator being discarded, except for testing milk, for which it is specially suited. For making butter, the cream is slightly soured by an acid powder, which is mixed with skimmed milk, according to special instructions. As the speciality of Danish butter is its keeping quality, it is all slightly salted, and most neatly packed in casks for export.

In the yard near the buildings was an enormous black heap, which proved to be ice covered with peat; on the sandy soil of Denmark this system may preserve ice better than on the clays of England. The Danes use vast quantities of ice for their milk and butter, and consider the cost trifling. For deep setting (practised in some dairies), for making butter firm, and for many other purposes, this abundance of ice is very useful.

We next visited a Co-operative Dairy in the neighbourhood. This is supplied chiefly by small farmers, whose butter used to fetch a very low price. The building is simply constructed, and the business is inexpensively, though carefully, conducted by a Committee, elected from the various parishes. This dairy receives the milk of 900 cows, and each farmer gives security for 10 kroner (about 11s.) for each cow that he keeps. On this the Bank makes advances at 5 per cent., which pays off capital and interest in thirty years. Neither the Treasurer, who is usually the village schoolmaster, nor the Committee receive any salary. The Manager receives 280*l.* per annum, out of which he has to pay for the labour, and this leaves about half the amount named for himself. The Committee pay for coal, salt and other materials, and arrange with one or more men (small farmers) to drive round and collect all the milk twice a day, and they return 75 per cent. of it as separated milk.

Each farmer used to receive about 4*l.* a gallon for his milk throughout the year, besides having the skim-milk; but at present butter prices, not so much can be given. Payments of account are made every month; if there is a profit at the end of the year, each contributor receives a trifle more. Generally 20 or 27 lbs. of milk give a pound of butter. The milk supplied by each farmer is periodically tested in the presence of Committee-men, and its precise value is calculated from the result. Very heavy penalties are inflicted in Denmark for any agricultural dishonesty.

The system of ripening the cream at this factory is to add

to it, when freely separated, a souring mixture composed of pasteurised hand-skimmed milk, and the powder previously referred to. The cream is churned the next day.

We saw and tasted the butter in the cask ; it was exceedingly good. Its selling price (in English money) was 10*d.* per lb.

We next visited Børreby, near Skelskjør, the picturesque old mansion of Chamberlain Castenschjold, a large landowner, whose heart is in the management of his home farm. The general arrangements here were similar to those already described. The buildings are vast, as all the cows, some young stock, and a number of pigs, are kept in well-covered substantial buildings all the winter ; and a great quantity of hay and corn is stacked in the barns. We particularly noticed that a roof of thatch had been replaced by Swedish wooden tiles, 18 in. long by 4 in. wide. The pitch was high, which is necessary for these tiles. This roof cost, including labour and laths, 2½*d.* per square foot, and had lasted twenty-seven years, with very little repair, being still in good order. Mr. Castenschjold recommended that Swedes should be employed to put up a roof of this description. For roofs at a low pitch he has used paper over wood, tarred. He prefers, however, the tiles, which are cheap and picturesque. I found similar roofs in other places ; but they did not seem to have lasted so well. Probably some skill is required in their construction. I may remark that we found whatever Mr. Castenschjold undertook at Børreby generally proved successful.

The pigs kept on these farms are Yorkshire, or a cross of that breed with Danish. They are fatted and sold when weighing about nine score.

The other places that we visited, Basnæs (Mr. Scavinius's), Wedellsborg, the magnificent seat of Count Wedell, near Odensé, Engelsholm, near Veile, in Jutland (Mr. Beck's), and Sophiendal (Mr. Ulrik's), in Zealand, were conducted generally on the same principles as those we had previously seen. Count Wedell's buildings are the finest in Denmark, with the exception of those of Baron Reedz Thott, at Gaunce. They cost 15,000*l.*, and can therefore hardly be taken as an example which it would be wise to follow. We particularly noticed that, in the enormous houses for the pigs, there were at certain points coils of steam pipes, the warmth from which is doubtless of great benefit to the young pigs during the winter.

At Engelsholm, the Swedish roof is used for buildings ; but Mr. Beck cuts out the wood at his own mill, and has it thicker than the Swedish timber, and only 3 in. broad. He estimates the expense at 1½*d.* the square foot. He has the wood impregnated with copper sulphate to preserve it. If it is tarred, gas tar should not be used, but Stockholm tar or creosote. Each

tile is 18 in. by 3 in., and is  $\frac{1}{4}$  in. thick at one end, and thin at the other.

At all these farms from 100 to 200 cows are kept, and 5 times more. About 4 acres are allowed for each cow; but than half of this is in corn. A seven-course rotation is followed but Mr. Ulrik, a gentleman farmer, who, in spite of bad times can make money, and who says that the use of bad times make clever men, recommended the following rotation:—

|               |                    |
|---------------|--------------------|
| Fallow.       | Peas and mangolds. |
| Rye or wheat. | Barley.            |
| Barley.       | Oats.              |
| Oats.         | Clover.            |
| Clover.       | Clover.            |
| Clover.       |                    |

Carrots are grown to some extent, and in some places quantity of sugar beet. It is not intended to increase the latter, which is sufficient for the country, and would not pay to export.

A portable weighing-machine for cattle and pigs is used at Engelsholm. Mr. Beck told me that the iron-work cost 6*l.*, and the rest was done by the carpenter. It can be moved from farm to farm, which renders it more convenient than a weigh-bridge, and it is cheaper. The English farmers who were with me considered that such a machine would be very useful on an estate.

A watering stone is placed in the cowhouse between two cows, and this is trapped to prevent any water running back, and carrying infection to another beast.

Near Skelskjör we visited one of the great Experimental Stations established by the Royal Agricultural Society, subsidised by Government. We were conducted over it by its courteous Manager, Mr. Nielson. It consists of about 620 acres on which fourteen men are employed, and a few cattle are kept for the sake of their manure. Each plot (of which there are 25 of 2½ acres each) is kept for one sort of grain, and is divided into 25 parts each of these being treated with a different manure. The manure is analysed before it is applied, and a record of everything is kept. When the corn is ripe a portion, viz. a fair sample taken from the middle of the plot, is carefully measured, thrashed out, and weighed, and particulars are recorded. An enormous number of experiments are made every year with each kind of corn. The results are published, and are, of course, of the greatest use to the Danish farmer.

The National Laboratory at Copenhagen, under the direct

Professor Storch, is another instance of the fostering care for agriculture of the Danish Government. Here we saw the result of testing the amount of water in butter, which showed that in Danish butter the average of 6,000 samples is  $14\frac{1}{2}$  per cent., while in Irish it is 19 per cent. The amount of fat in different samples of milk is tested by pouring the milk from a fixed measure into cups full of Kaolin or China earth, which are then dried, and subsequently the fat is extracted by ether, and when dried is weighed. The first of these dryings shows the percentage of water, and the second of butter-fat.

A Butter Show is held here every month. Manufacturers send their butter in tubs of one size, which are so placed that the judges have no clue to their ownership. They are arranged in three rooms, and the judges, in parties of three, go through all the exhibits separately and afterwards compare notes. One-third of the exhibitors (the best) have their names and particulars as to the quality of their butter published, but any butter having more than 15 per cent. of water is excluded. The other exhibitors are privately furnished with the observations of the judges. Each party of judges consists of one expert and two dealers, who are paid by Government, but are selected by the authorities at the Experiment Station, and are often members of the Royal Agricultural Society. The experts, when in the neighbourhood of the dairies whence exhibits are sent, visit and advise the exhibitors. The barrels contain 1 cwt. of butter each. They are kept on straw for a fortnight to see how much brine runs out, and the dairies are compensated for the loss.

Koch's tuberculin for detecting tuberculosis in cows is also made at the Laboratory. Formerly this disease was very common in Denmark, but now it is almost eradicated. Any farmer who desires it can have his stock inspected, on the condition that he will follow the injunctions of the inspector. He is required to keep any infected animal in a separate stable, and to have it tended by a separate cowman. If it has a calf, the latter is taken away and fed on pasteurised milk. In one case only has the calf been infected with the disease when due care has been exercised.

The last, but not the least, interesting of the sights that we saw was the great milk business of Mr. Busck, at Copenhagen. This gentleman, who largely dealt in butter, was struck with the difficulty that one of his workmen experienced in getting pure milk for his children. This induced him to start this business, which has grown rapidly, and now constitutes the chief milk supply of the city.

The farmers who supply him, set the morning's milk fresh from the cow in deep round cans placed in ice, and in 10

hours a good deal of the cream has risen. This is skimmed by hand and placed in cans, as is also the skimmed milk. The new milk of the evening is cooled to 40°, and the two milkings are then sent up by the same train to a station (Frederiksberg) in the suburbs of Copenhagen, close to which are the buildings of the Milk Company. About nine in the evening we accompanied Mr. Busck to this building and saw the milk cans arrive. On its arrival the milk is instantly tested by tasting, and if the temperature is above 50° Fahr. it is kept apart and used for making butter and skim cheese, and the proceeds of this sale are given to the farmer. Samples of each supply of milk or cream are taken and tested, a sample of the general milk and cream to be sent out the next morning being forwarded to the public analyst, who publishes the result of his analysis. The whole of the milk and cream is filtered, and we were shown that, notwithstanding previous straining, a considerable amount of foreign matter is extracted. Formerly sponges were used, but now an excellent system has been adopted of filtering upwards through five layers of gravel, the lowest being half the size of a pea, the highest that of a pin's head. Perforated tin plates are placed between each layer. Over this are five layers of filtering cloth, and the whole is kept in place by a pyramid of iron-work. The gravel is taken out every day washed in soda and hot water, and pasteurised by being steamed to 302° Fahr. Four of these filters are used, viz., for cream, children's milk, ordinary milk, and skim milk. The ordinary and skim milk are, on their arrival, placed in ice tanks to be filtered in the morning, and run off into ordinary vessels for distribution; but the cream, after being sampled and filtered, is run into glass bottles and placed in ice, as is also the children's milk. Numbers of women in clean white caps are employed at this work till 2 in the morning. The farms are inspected once a fortnight, and strict regulations are enforced, not only with reference to the health of the cows, but also to the feeding of them, and to the observance of cleanliness in milking. The regulations as to feeding are especially strict with regard to the cows supplying milk for children—no cake, roots, or vetch being allowed; a small amount only of carrots may be given. Notice of any illness among the cattle must be immediately furnished to the Company, and any cow found to be suffering from tuberculosis must be separated from the herd and her milk kept back. The Company behave with great liberality in compensating the farmers for loss incurred by these regulations. In this slight sketch it is not possible to give all the details of the business referred to, but the three following points are especially worthy of notice.

1st. That the public appreciate the undertaking, as is shown by an enormous increase of business in a few years.

2nd. That the farmers find it answers their purpose to supply milk (Mr. Ulrik, the cleverest and most successful farmer in Denmark, sends his milk to the Company).

3rd. That the Company is a sound financial undertaking.

At first, the work was in a great degree experimental, and only a small rate of interest was paid; but now it is, as Mr. Busck assures us, on a sound financial basis, and pays a fair interest. The shareholders have agreed not to divide more than 5 per cent.; but, when possible, to reduce the retail price of the milk. Thus, when there has been a profit of more than 5 per cent., the consumers have reaped the advantage.

I must not omit to mention a short visit which we paid to Fru Nilsen's farm near Holte. This remarkable woman, who some time ago was appointed butter-maker to the King, succeeded, by her energy and capability, in making various cheeses, hitherto unknown in Denmark, viz.:—Cheshire, Gorgonzola, Camembert, and Norwegian. We tasted the first and last, which were very good. Her dairy is small, and her appliances are of an ordinary character. Her speciality seemed to be her cheese-rooms, where the different sorts of cheese are kept each in their own room, with no communication with the outer air. Her farm is quite small; she has only about sixteen cows, but she buys milk from her neighbours. Her establishment is a grand instance of successful dairywork without any costly appliances.

I have not attempted any exhaustive description of Danish agriculture, but merely to indicate briefly the manner in which, by energy and enterprise, the Danish farmers have succeeded in making agriculture profitable in spite of bad times and very low prices. It seems quite possible that, by adopting the Danish system, much of the good arable land of England might be used for dairy farming instead of being converted into poor unsatisfactory pasture. The wages in the East of England are not much higher than those of Denmark. If female labour cannot be obtained on the spot, it might be imported as is done in Denmark. Carriage of butter is not heavy, but still there would always be in this respect a small difference in our favour. Great energy is required to carry out these changes, but that is just the quality which has brought about all our improvements in farming; and, in spite of the long depression, let us hope that the supply of energy is not yet exhausted.

It should be noted that in the two following important particulars, the Danish Government has afforded agriculture

such protection against fraud as gives the Dane a disadvantage over the Englishman.

1. Enormous fines (sometimes 1,000*l.*) are inflicted even for the adulteration of seed; and in the case of margarine, if as butter is punished, on a third conviction, with imprisonment without the option of a fine.

2. The execution of this law is not left to the too tender mercies of a Town Council, but is carried out rigorously by Government inspectors.

When I say that the wholesale price of butter in Derby is as high as the retail price of so-called Danish butter in England, the necessity for such action is obvious. In the West of England such Government action would be one of the most efficient remedies for agricultural distress.

#### V.—*Farm Botany*. By C. T. D. ACLAND.

AMONG the many expedients which by various persons have been recommended for the removal of the chronic depression of agriculture, one which is perhaps more often put forward than any other is the teaching of science to those who are engaged in farming. This expedient has a charm of vagueness about it, which is probably due to the haziness which, in the minds of those who recommend it, surrounds the ideas of science and of agriculture alike. We do not hear this expedient recommended either by men trained in science, or by men with experience in agriculture, because these men know how incompatible is the acquisition of the adequate knowledge of any one science, with the circumstances that produce, and the experience which is needed to train, a practical farmer.

The following extract from a leading weekly review illustrates the statement just made:—

"The ideal farmer is a widely accomplished man. Stated in good general education, he has mastered the theoretical practice of farming, knows something of chemistry, geology, and botany, of veterinary surgery, animal physiology, engineering, of mechanics, carpentry, smithwork, of mensuration, levelling, land surveying, of farriery, and of forestry, of bee-keeping, bees, fruit, poultry, and, finally, of accurate book-keeping."

The actual English farmer is blankly ignorant of all these things; his practice is obsolete, his science nil."

The writer of these words may have known something of farming. He cannot have come much into contact with fa-



If he had, he would have learnt that in practice the farmer usually does know a great deal, and those who would improve his practice will generally find that, though his reasons for it may be entirely unscientific and often erroneous, still a very large proportion of it is based upon experience, and any improvement of it must have the support of experience before it will be acceptable to him.

The very fact that there are so many points at which his practice comes into contact with, and must, in order to be successful, be in harmony with various natural laws, while, on the one hand, it makes adequate scientific training impossible for the practical agriculturist, yet renders it, on the other hand, all the more essential to prepare his mind for the due appreciation of the immense practical value to him of the progress in science which is, on all sides of him, being achieved by scientific investigation of the facts which he has to deal with in a practical way.

Much no doubt may be done, and more is being done now than formerly, at the best secondary schools to provide that which is of greater value than anything else for farmers' sons, namely, a *good general education*.

Farmers can now, if they choose to enquire, find schools at very moderate cost, where their sons can acquire a knowledge of French or German, such as may enable them to read those languages, and further, what is no less important, good teaching in elementary geometry, mechanics, and hydrostatics, as well as a sufficient mastery of English to give them a taste for reading and an intelligent appreciation of what they read.

Unfortunately, however, it must remain true, that however skilful the trainer, however apt the student, and however zealous both teacher and pupil may be, still, in ninety-nine out of a hundred cases, for sons of farmers, or for boys intending to make their living by agriculture, neither can time be found nor is money forthcoming (even if we had teachers enough, which we have not), to combine a scientific with a practical training.

Consequently, we can hardly hope to do more with the time and means at our disposal, than to provide as good a general education as possible, and to combine with that such a training by object lessons as may stimulate and develop the faculty of accurate observation and careful inference, and prepare the mind for a somewhat sympathetic appreciation of scientific processes, and a modest though critical attitude towards the conclusions deduced from them. Upon a good general education may be grafted a rudimentary knowledge, sound as far as it goes, of the first stages of one or perhaps more of the sciences bearing on the practice of farming.

Now, whatever be the nature of the farm, it can hardly be denied that the most fundamental and most generally applicable of these sciences is that of Botany—the study of the habit and structure of plants, their diseases, and the conditions which influence their growth. Even successful dairying, or successful stock-feeding, depend upon successful cultivation of the grasses which provide the food of the stock. Yet how rarely it happens that a farmer has had the advantage of an elementary training in botany sufficient to enable him to form a clear notion of the botanical aspect of his farm!

Can it be said that half the present occupants of farms can give the names of the grasses that they cultivate; which of them flower early and which late; which grasses have roots and which have not; which grasses have large seeds and which have small ones? Do not the majority of them look implicitly to their local seedsman, who probably knows nothing of their farm, and has very little more botanical knowledge than his customers?

Nevertheless, successful cultivation must, to a large extent, depend upon such details as these which relate to the plants themselves, as also upon those which have regard to the soil and other surroundings of the plant, and upon which other sciences would be called into play.

Farming depends upon details; and details must be accurately dealt with if any success is to be achieved.

And here one of the best known and most often cited of maxims—"De minimis non curat lex"—comes in to show that it is that so little is to be hoped for by the farmer from legislation. Again, the old saw, "Look carefully after the pen and the pounds will look after themselves," is another aspect of the same truth.

It seems then worth while, so far as space can be afforded, to make an effort to direct the attention of agriculturists generally (very many of whom it is to be feared shrink from the purchase of books, and confine their reading mainly to their newspapers) to the necessity of using to the utmost all the sources of accurate information open to them on matters which affect in detail, upon subjects of the greatest importance to their ordinary practice in farming. In this regard, the journals of agricultural societies, there are stored up a vast amount of facts in great number upon such subjects; but, besides these, there are numerous manuals prepared by scientific men, in which the facts are registered and reduced to a practical form the result of accurate observation, approaching as near to certainty as is possible in the illimitable field of science. The importance to a farmer of studying some one or other of them may be

trated by reference to one branch only of the subjects with which they deal.

Among, for instance, the tens of thousands of different kinds of fungi which have been observed, registered, tabulated, and studied, there are a certain number—such as the ergot, which may affect his stock, the various rusts, mildews, &c., which affect his cereals and grasses, and others which affect the root-crops or fruit-trees—the life history of which is of material interest to the farmer.

Upon many of these much information has been accumulated, and the Government, with wise liberality, has been issuing leaflets and articles in the 'Journal of the Board of Agriculture,' in which the main facts are stated, and advice is given as to the best methods of treatment.

Upon the subject of ergot, articles and memoranda are to be found, both in former volumes of this 'Journal,' and in the volumes of the Journal of the Royal Agricultural Society, and it is described in most, if not in all, of the manuals which profess to deal with such subjects. And yet, for my own part, I must plead guilty of utter ignorance about it until four or five years ago, when specimens of it growing near my home were pointed out to me by Mr. Carruthers—upon a farm where abortion among the stock had been frequent. Since then, measuring the ignorance of other men by my own, which perhaps I had no right to do, I have lost no opportunity of showing it to any farmer who might be with me when I have seen it; and in the course of the four years I have not met with three farmers who knew it by sight, or anything about its life history, and, though this may be exceptional, I have certainly found not less than twenty or thirty who knew nothing whatever about it.

Not only so, but in one of the leading agricultural weekly papers, a few days ago, I noticed a recommendation (among the questions and answers) on the subject of abortion, that one of the best means of stopping it in a herd would be to keep pigs as near the centre of the shippens as possible, in the belief, forsooth, which I believe to be entirely erroneous, that the smell of the pigs is stronger than that of other animals, and that, therefore, they would be more effective in prevention than goats or donkeys. No doubt goats and donkeys have been recommended as helping to prevent the recurrence of abortion, *not*, however, on account of their being odoriferous, *but because* they will graze after other kinds of stock and keep the grass short round their droppings. Therefore, the money spent in erecting a pigstye in the place recommended would be far better expended in keeping the farm clear of rank grasses in the

hedges and ditches, so that the ergot might find fewer chances of propagation and dissemination.

Surely any farmer who had invested half-a-crown in a book, which would tell him about farm pests, diseases of plants, vegetable life on a farm, or kindred topics, and had read the abundant practical hints contained therein upon a subject of so much importance as this well-known cause of abortion, and following up his study by practice had taken measures to clear his farm of rank grasses, would find that half-crown better invested than many of those which are spent on market-days!

For the recommendations made in such manuals as those I have alluded to are the results of long, minute, careful study of the life; history of these things by scientific men, *i.e.* men trained to careful observation, and to careful and accurate description and recording—men who have devoted years to absolutely nothing else but the observation and collection of such facts and to the most rigorous verification of theories and testing of conclusions based upon them. Their theories may seem improbable and marvellous; their suggestions may at first appear unreasonable or unpractical. But, at least, the facts are worth knowing; the knowledge recorded is worth study. And if only that were achieved in an adequate degree, a practical and shrewd farmer might probably be trusted to grapple with the practical problem—how to utilise these facts. But, first of all, he must know them.

To take another plague, common and costly enough, but of a very different kind—the rust (sometimes called mildew) of wheat and barley. How many farmers have heard of the connection between the rust of wheat and the fungus which is found on the Common Berberry and on the Mahonia? This connection has, no doubt, been the subject of much dispute; but it is now so absolutely certain, that the subject is one of vital interest to farmers who still wish to grow corn.

Again, how many farmers have in the least realised the conditions of propagation and hibernation of these fungi, and of the extreme importance of keeping hedges clean, not only of ergotised, but of rusted or mildewed grasses, and of such plants as coltsfoot, on which an æcidium, which appears in yellow spots, is constantly propagated, which will give rust or mildew to millions of meadow-grasses around? Consequently, the leaves of the coltsfoot are left unmolested, and the rusted or mildewed grass is allowed to be used for food or for manure, and so to lay up stores of future infection. (By the way, *what would be the manurial value of such dung made of rusted or mildewed straw, considering the injury it is capable of doing?*)

There is another very familiar plague of an entirely different

ture—the propagation of which could be very greatly diminished if farmers realised the nature of the origin and mode of life of the fungus producing it—namely, Finger-and-toe (Club-root). This, again, affords an instance of the importance of clean farming, as the existence of Charlock on a farm, or of other plants of the same tribe may, by supplying plants on which the fungus can grow, render useless all attempts to exterminate this plague.

So with smut, bunt, various mildews, potato disease, damping off, hop disease, and others—there is probably not one of the plagues to which farm or garden crops or fruit-trees are commonly subject, which has not been most completely and minutely studied, and with regard to which preventive measures based upon such study have not been suggested. It, sad to say, it remains to this day true that the average farmer never dreams of providing himself with any of the books, tracts, &c., which are produced in profusion for his benefit; nor is it too much to say, that if he is brought into contact with them he is apt to regard, or rather disregard, them as theoretical, abstract, and unpractical, *inasmuch as they are founded upon science.*

The great improvement, however, in the secondary schools in rural districts, at which during the last twenty years the younger members of the agricultural population have received their own education and educated their sons, affords at least this ground for hope for the future of British agriculture, that there is among the younger farmers more and more willingness shown to profit by the results of the earnest and conscientious labour of scientific men.

The work at Rothamstead and Woburn is, unquestionably, beginning to bear fruit both with regard to the use and abuse of manures, and the selection and arrangement of crops. But both of these Institutions are so obviously agricultural, and so closely bound up with practice, as readily to gain more favourable attention than is given to that which is more distinctly and obviously scientific.

My object in the foregoing remarks has been, for that reason, to show that there are other equally important and far-reaching results which have been achieved by what *appears to be* more trifling study, and is more intimidating to the ordinary reader in its complexity and detail, but which none the less deserve early, careful, and constant attention of the farmer. Such knowledge can be gained from manuals which are cheaply accessible, and from leaflets which are being spread broadcast by the Board of Agriculture and other Institutions. Yet, from what I have been able to learn by observation, these are too

often neglected, forgotten, or despised by the practical farmer. "Practice with Science" is the motto of the Royal Agricultural Society; "Work and Learn" is our own.

Ignatius Loyola said, "Pray as if nothing could be done by work. Work as if nothing could be done by prayer." It might be said nowadays to the struggling agriculturist, "Work as if nothing could be learnt by study. Study as if nothing could be learnt by work."

VI.—*Food Adulteration, more especially as it affects the Farmer.* By Prof. JAMES LONG.

THE adulteration of food is now recognised as being not extensive but general. Food adulteration has been carried on for long, but only during recent years, since the reign of free competition commenced, have the products of the farm, when consumed in such enormous quantities by the people, been extensively mixed with cheaper and inferior materials. Articles of food which chiefly affect the farmer and which have been most subject to adulteration, are milk (in its natural or condensed form), cream, butter, and cheese. We are unfortunately unable to produce all the butter and cheese we require in this country. Our total annual yield of milk, allowing 10 gallons to each cow and making a deduction on account of those which are dry, we estimate at 1,400,000,000 gallons, whereas our total consumption of milk and of material produced from milk we estimate \* as equal to at least 2,650,000,000 gallons. The import statistics confirm these figures so far as confirmation is possible. Although competition has been keen among the butter makers of France, Denmark, Australia, and the cheese makers of Canada and the United States, and prices have fallen to a considerable extent, the ingenuity of man—especially his power to utilise scientific teaching—has enabled him to produce imitations which undersell honest producers in their own markets. The introduction of margarine directed the attention of the French and the Dutch in particular to its suitability as a butter adulterant, while the separator has enabled the unscrupulous milk dealer to utilise, instead of water, milk deprived of its cream, for the purpose of adulterating milk, and then by underselling his neighbours, to obtain the custom which legitimately belongs

\* 'Nineteenth Century,' January, 1896.

mem. The skill of the analyst enables the latter to detect the presence of added water in milk, and but for the modern adulterant, separated milk, the milk supply of our cities would probably be of much higher quality. We shall presently see why it is that the analyst is unable to determine the presence of separated milk if adulteration has been skilfully performed. This is one of the misfortunes of the time, so far as the dairy farmer is concerned, that, under given conditions, which are perfectly understood and carried out by the unscrupulous manufacturer and vendor, it cannot be determined with absolute certainty whether a sample of milk or butter is adulterated or not, however morally certain the analyst may be. I have no complaint to make with regard to the sale of separated milk or of margarine as such; both are foods of considerable value to the poorer classes, and both should contribute to the economy of the table of the poor; but instead of this consummation the poor are as mercilessly defrauded as the rich, while they are less able to sustain this infliction.

Margarine is produced in the British Islands in some twenty-three factories. It is to be hoped that it is sold under its proper name, and under such conditions fraud is neither possible nor tolerated. But in some cases margarine and butter are so mixed that the cleverest butter-taster might be easily deceived. There can be but one object in the production of this mixture which undersells butter at the factory, and which often oversells it at the counter of the retailer. Curiously enough the Dutch, who, from the first, have been the leading makers of margarine in the world, and who import millions of cwts. of fat and oil from America for the purpose, have discovered a method of underselling the margarine makers of this country by introducing a high percentage of water into the margarine, so that in the interest of the poor, who are the largest consumers of margarine, our Government will have to deal with the adulteration of this vilest adulterant of all. Margarine is not the only material used in the adulteration of butter. In some parts of the world, many in particular, water is found to be as simple, and in all probability as profitable, an adulterant, and until the Legislature has determined upon a standard for water in butter, those who introduce it systematically and skilfully will continue to reap their unjust profits. The employment of preservatives has also to be reckoned with. Preservatives may enable the colonial and foreign producer of butter to compete in our markets, but at the expense of the introduction of more or less deleterious chemicals into the stomach of the consumer; in other words, a "doctored" article which has been manufactured in many weeks—it may be for months—is enabled to realise as

much per pound as a perfectly fresh article which contains no foreign material whatever. The employment of margarine and other fats in the manufacture of cheese has not received much public notice. Adulterated cheese is plentiful enough, especially in the United States, but the low price of pure cheese has seriously checked its production, and unless prices rise and become firmer we need not anticipate any extension of this trade.

Strangely enough the attention of the public has hardly been drawn to the practice of adulterating cream. At present, any material obtained from milk which at all resembles cream may be dignified by the name without any infringement of the law. There is no doubt that the consumer is systematically defrauded in this manner. The purchaser of cream by the gallon, either for redistribution or for the manufacture of butter, pays from 6s. in summer to 8s. in winter. This cream, which is often inferior, adulterated, and artificially thickened, is thinned down by the admixture of milk, and the consumer pays for it at the rate of from 16s. to 20s. per gallon. Until there is a standard of quality for cream the consumer will be liable to such frauds.

Of condensed milk there are some forty brands on the market, many of which are produced from skimmed milk; and again the poor are among the chief sufferers. Condensed milk is a cheap food largely consumed by the poorer and working classes of our large towns. These people are great drinkers of tea to which condensed milk, on account of its sweetness, is a most agreeable addition. They have no knowledge of the functions of food, and they do not inquire whether the milk was first skimmed or not; a low price is all they demand. To the Select Committee on Food Products Adulteration I handed in a tabulated collection of labels from different brands of condensed milk with the weights of the tins, the prices charged, and the quality of the milk as shown by analysis. In some cases the tin contained skimmed milk, while there was no reference to the fact on the label; in others the word "skim" was in such small type that it could not be seen unless carefully looked for. In some the milk was highly recommended for *invalids and infants*, although the one material—viz., the cream—which is of such special value to both, had been almost wholly removed. Those who have made urgent requests for legislation will not be satisfied unless provision is made for the protection of the buyer of condensed milk.

In spite of the Food and Drugs Act and the Margarine Act, little has been done by many of the Local Authorities in England and Wales to check adulteration, and owing to this laxity and



difference the present extensive system of adulteration has, to a large measure, been allowed to grow up. There are in the country some 240 public analysts, while those who are authorised to take samples, including the Medical Officers of Health, the Inspectors of Weights and Measures, and the Inspectors of Nuisances, are so numerous that no excuse can be made for the lack of all effort in many districts to suppress fraud. Over a great portion of England the law has been a dead letter, and even where samples have been taken in a more or less extensive manner, the results have been utterly disregarded. The number of adulterated samples in Lambeth was in a recent year 47 per cent. of those taken, and in St. George's, Southwark, 46 per cent., while in Lewisham it was only 1·6 per cent. If it was not the function of the authorities in Lambeth or St. George's to ascertain why these figures were so high, the Local Government Board should at least have made some investigations in the matter. How little attention some local authorities pay to the prevention of Food Adulteration, which is as essential for the protection of the life and health of the people as it is for the guarding of their pockets, is well illustrated by the fact that in one large city the annual salary of the analyst was only 5*l*. As a rule the percentage of adulterated samples is in an inverse ratio to the number of samples taken. Wherever the work is thoroughly performed fraud is checked, but where the authorities neglect their duty it becomes rampant. To some extent it is believed that adulteration is persisted in because of the absence of a standard of quality, or by the timid and erratic action of Somerset House, which strangely enough has not worked in unison with the public analysts of the country.

#### MILK.

There is no standard of quality for milk. As a rule public analysts pass a sample as genuine which contains 3 per cent. of water and 8·5 per cent. of solids not fat, but they frequently refrain from condemning what they are unable to certify as pure milk, and in consequence the milk vendor usually obtains the benefit of the doubt. The chemists at Somerset House, to whom references are occasionally made, adopt a limit of 75 per cent. of fat and 8·5 per cent. of solids other than water, which naturally enough brings them into conflict with the public analysts, among whom are specialists of repute. Formerly the Somerset House limit for fat was 2·5 per cent; but when by a simple investigation, which should have been made before, new light was thrown upon the subject, the limit was raised. In

the investigation in question samples were taken from 1 churns of milk. The lowest per cent. of fat found was the highest 5·61, and the average 4·0; yet in the face of the fact the official limit remains at 2·75. With regard to the future, it may be pointed out that if a low standard of adulteration is certain to increase, while it will as it diminish in proportion as the standard is high. It may, however, be dangerous to the reputation of the producer or the salesman if it were fixed *too* high. It is a fact worth notice, in connection with milk analysis, that one method adopted at Somerset House, and another by the leading analysts; it is probable that in each case practitioners follow the process they adopt. Adulteration is invariably during hot weather when milk is in demand and when the supply is short.

Let us further examine the position of affairs in connection with this question of milk adulteration. The proposal of a moderately high standard is opposed by the milk trade and some intelligent farmers. While it is natural that those who are accustomed to adulterate milk should object to a high standard, it is not a little surprising that those against no such charge can be brought to deprecate a moderate standard on the ground of possible indictment and fine. It is by the traders that milk pure, but below the standard, may any time be sent up from the farm, and that they may be fore unwittingly break the law. It remains, therefore, to be shown that with a low standard—and 3 per cent. is low—the law can be broken with impunity, but that there is no fear if the figure is substantially raised. How can a standard be fixed sufficiently high to check fraud, enable buyers to obtain milk of good quality, and, at the same time, to prevent any possible injustice to the farmer or the salesman. It may be remarked, in passing, that the absence of a standard and the existence of the extremely low standard adopted at Somerset House have induced farmers to breed for quantity, without any regard to quality, of no long as it will pass muster. In a great measure, competition has brought down prices with the usual result, that when an article is not protected by law its quality is diminished. It may be taken then that both the producer and the salesman have lost large sums of money in consequence of the non-existence of an efficient law and of the utterly inadequate regulations adopted by the one department to which the public have no right to look for protection.

**UGGESTIONS FOR THE MAINTENANCE OF QUALITY OF MILK.**

it possible, by the adoption of any practical method, to gain high quality in a milking herd, and prevent the possibility of milk being produced or sent out below such a standard as 3·25 per cent. of fat with 12 per cent. of total solids? I contend that if the following suggestions are carried into practice no possible standard need be feared.

Improve the herd by the addition of a Jersey or Guernsey to every eight or ten head of healthy well-conditioned cattle. Select and breed for quality, as well as quantity, of milk, for even among cattle of good Shorthorn type there is plenty of cows which produce milk averaging from 4·5 per cent. of fat. By the practice of testing animals before purchasing, the introduction of such cattle into a herd is made possible as well as the rejection of those which produce poor milk. This suggestion may possibly be considered impractical, but, in the future, buyers will become more aware of the fact that they are buying in the dark when purchasing cows of whose milking capacity they know nothing. It is urged that dealers and others will object to such a suggestion, we reply that having purchased of dealers upon this basis, the result has been the selection of immensely superior animals. The buyer would also do well in future to reject tuberculous cows as well as inferior milkers. Among the Ayrshires, so largely employed in many herds are cows which produce milk of high quality, and the same remark applies to the Jerseys and the Kerries. The animals of which this cannot be said are the nondescript mongrels and scrubs possessing neither quantity nor quality.

Regulate feeding with a view to the suppression of poor quality milk. Although it is probable that feeding does not increase the percentage of fat in milk, yet it is recognised that by the employment of large quantities of stimulating foods, such as grain, the quality of milk is decreased in consequence of the fat being increased. If, therefore, we would maintain quality we must cease to force quantity, which really means the overproduction of milk through the mouth of the cow.

Test the milk of the cows of the herd. This is one of the secrets of successful dairy farming. If the cow is, as she is supposed to be, a milk manufacturer, her food being the raw material, it is obvious that she is not worth retention if she fails to produce milk worth more than she costs to keep. The milk of each cow should be tested periodically and recorded. There is no excuse for any omission to test the fat—which is all

that is requisite—now that there are so many machine instruments adapted to perform this work with accurate speed. Even if they cost more than they should, the work performed is extremely valuable. I should prefer to test morning's milk—the evening's milk as a rule being richer especially in the spring, when grass, being plentiful, the milk is abundant and less rich in fat than at any other season. A record would enable the owner to weed out every inferior cow and to replace her with an animal which could be depended upon. If a farmer, knowing that there is a fixed legal standard, chooses to keep cattle which produce milk below the standard, he has himself to blame. Quality, too, always tells in the market and it is to the interest of the dairy farmer to ensure it.

4. Test the milk of the herd before the churns are despatched from the farm. If this appears to be a suggestion impossible to be carried out, a little reflection and a single test will show that it is not so. A sample may be taken from the bulk and while the milk is running over the refrigerator, and the percentage of fat as well as the quantity of milk shown, be recorded upon the back of the label. If this plan were adopted by all the farmers who adopted it would be able to fix upon the cows which contributed to the reduction of the quality of the milk. If it became necessary, keep their milk at home. If such a simple test exists no man who values his reputation should dream of despatching a sample of milk to town, the quality of which he is ignorant.

5. Milk the cows at specified times, as nearly as possible at the same hours apart, the object being to improve the quality of the morning milk, which is, as a rule, inferior to the milk of the evening. The longer the time which elapses between milking the poorer the quality of the milk.

6. The greatest care should be taken to ensure the cleanliness of the stripping of the cows, the last milk drawn being of far superior quality to the first.

#### UNCLEAN MILK.

The producer who thoroughly or even partly carries out the above suggestions might easily guarantee to produce milk containing 4 per cent. of fat, and there is little doubt that it would, the best buyers not being insensible to the importance of quality. Competition places difficulties in the way of producing high quality, for the public will buy anything that is cheap. At the present time the wholesale price of milk is not high enough to induce the farmer to produce even *clean* milk, much less *high* quality, and, regarded from the point of view of public health a new law dealing with the inspection

control of cattle-houses and dairies should be passed before a law dealing with adulteration. At present there is practically no inspection; consequently old buildings, filthy yards, manure-soaked stalls, dirty mangers and still dirtier cattle, are only too common, and it is without doubt true that the majority of the cattle and cattle-houses, as well as the men who milk the cattle, are utterly unfit to be in contact with an article of food which is consumed daily by almost every individual in the land. The difficulty of keeping, as of obtaining, milk perfectly pure is greater upon grass farms where litter is expensive. Cattle lying upon stalls not only soil their haunches and flanks but their udders, and daily washing and grooming would entail a heavier cost for labour than milk will bear. The majority of milkers pay no regard to the unclean condition, especially in the very early morning, of the cattle, and in large herds it is impossible for the master's eye to be everywhere at one time.

#### THE QUALITY OF MILK.

The proposal made to the Select Committee by the present writer was, that a milk standard should be fixed at 3·25 of fat, with 12 per cent. of total solids. Some of the leading agricultural bodies have shown their willingness to accept 3 and 12 per cent.; but will these figures prevent adulteration and ensure the sale of milk of normal quality to the consumer? Analyses of the milk of herds of cattle and of pure dairymen's samples in all civilised countries confirm my belief that the mixed milk of a herd does not contain less than 3·25 per cent. of fat, and that this comparatively low percentage is only applicable to the early spring months. There are occasionally exceptions, but investigation by an expert would almost invariably explain the reason. Sometimes the milk analysed is not a fair sample, sometimes the cows have not been stripped, or the milk has not been properly mixed, or perhaps milking takes place a very few hours before the evening's milk is drawn. There are several of the most important firms in England who already require their farm suppliers to send milk containing at least 3·25 per cent. of fat, and in one case known to me a wholesale firm requires 3·5 per cent. of fat. A Dorset farmer, Alderman Farmer, stated before the Select Committee that he despatched to London daily from 1,000 to 2,000 gallons, and that by his contract he was required to provide milk containing not less than 3·25 per cent. of fat. He added that he had no difficulty at all in keeping to this standard, and that in fact his average was considerably above it. *Out of 10,000 churns sent within the previous six months, he had only 16 churns so low as 3·25, and only three under that*

standard. In the evidence given by the present writer, reference was made to a number of cases in which the quality of milk exceeded this figure. Between the years 1894 and 1895 the consumption of milk in the city of New York increased 90 per cent., whereas the population increased only 25 per cent. The Commissioner who supplied this information expressed his belief that the increase was entirely owing to the greater purity of the milk supplied. In New York State the law does not permit the sale of adulterated milk, which is described as follows: "(1) Milk containing more than 88 per cent. water or fluids. (2) Milk containing less than 12 per cent. of milk solids. (3) Milk containing less than 3 per cent. fat. (4) Milk drawn from cows within fifteen days before five days after parturition. (5) Milk drawn from animals fed with distillery waste, or any substance in a state of fermentation, putrefaction, or any unhealthy foods. (6) Milk drawn from cows kept in a crowded or unhealthy condition. (7) Milk from which any part of the cream has been removed. (8) Milk to which has been added, or into which has been introduced any foreign substance whatever." In New York City the standard is practically 12½ per cent., the Dairy Commission and the Sanitary Authorities working together upon this basis. The figures taken by the writer from the books of the Commission show that the average per cent. of fat in the samples taken was 4.2. In the city of Boston 13 per cent. of solids is adopted, with the result that prosecutions have been systematically decreased. I am willing to admit that it would be a wise regulation to provide for the sale of the morning's milk of any herd whose owner's milk has been found deficient. Moreover, the milk of individual cows is often abnormal in quality, sometimes falling below 10 per cent. even 2½ per cent. of fat; in a country village, therefore, the milk is retailed from single cows, nothing would be simpler than to appeal to the animal, and nothing simpler than to secure a home conviction or an honourable acquittal in this way. It is evident, too, that, in framing regulations for the carrying out of the law, some provision should be made for the dishonest employes, who have been frequently discovered in the act of tampering with milk. If the milk of a farmer is sampled for analysis it should be at the station of despatch on its way to that station. Having left the hands of the producer he ought not to be held responsible unless his milk is locked, although adulteration is even then possible. The platforms at our great railway termini are frequently crowded with hundreds of churns at midnight, where, as every

rienced person is aware, milk is largely manipulated by vendors and their servants before its removal. It is impossible that a farmer can be held responsible for the quality or condition of milk which is exposed in this manner.

I have referred to the possibility of adulterated milk being undetected by the analyst. Let us suppose the existing analyst's limit of 3 per cent. is adopted as a legal standard. Under this condition a churn of milk containing 3·5 per cent. of fat can be mixed with separated milk to the extent of 14 per cent., and upon analysis will still be found to be up to the standard. A churn of 4 per cent. milk could be adulterated to the extent of 25 per cent., while milk containing 4·5 per cent. of fat would pass muster, even though it were mixed with one-third its volume of separated milk. The higher the standard is fixed, therefore, the less possibility is there of adulteration. The addition of separated milk increases the percentage of non-fatty solids, and it has been suggested that where milk contains a high percentage of these solids it should be suspected, but, generally speaking, the solids not fat follow the percentage of fat; in other words, a milk rich in fat is generally rich in solids not fat. It would at any rate be foolish to condemn a sample which contained a fair proportion of fat because it contained an unusual proportion of other solids, and as those solids are valuable as food, the higher they are the better. We may suspect a sample with a high proportion of solids not fat, when the fat is low, but if it is up to the standard there can be no reason for rejecting it.

Finally, I would urge that the use of colouring matter should be absolutely prohibited. It is not food, and it is only employed for the purpose of deception. The employment of chemical preservatives should also be prohibited. Separated milk should, in whatever vessel it is placed, be labelled in large black letters, and the penalties for its sale as new milk, whether alone or as part of a mixture, should be more severe. Nothing could be more important than the appointment of inspectors under the Board of Agriculture or the Board of Trade, preferably the former department, who should travel systematically with the object of ensuring the proper working of the law by local authorities. Such officials should also be required to visit factories in particular, with the object of informing themselves as to the manner in which separated milk is disposed of, and at the same time should perform the duty of inspectors in connection with the employment of margarine and the manufacture of condensed milk.

**CONDENSED MILK.**

The fact that the money value per tin of the skim milk for condensing is in many cases only one halfpenny or eighths of a penny, is sufficient to show that the buyer, is not actually defrauded, is placed at an immense disadvantage. The working classes cannot be too frequently reminded as in purchasing condensed skim milk, they are paying 4*d.* for a halfpennyworth—plus a small quantity of sugar would obtain at least six times the quantity if they purchased it first hand from the farmer. A new law on the subject satisfactory, should include—

1. The proposals 8 to 13, under the head of butter, as to the requirements of condensed milk.
2. Labelling in black or dark blue bold letters across the face of the ticket on each tin with the words *skim milk* in every case in which cream has been abstracted.
3. Each tin to contain 16 oz. of condensed milk.

**BUTTER.**

The percentage of adulterated samples of butter is as it was eighteen years ago, and the inference, therefore, neither the Food and Drugs Act nor the Margarine Act has any serious influence in checking fraud. Butter is adulterated by the addition of margarine, of water, of colouring matter, preservatives. The addition of preservatives and of a colouring is not, however, made with the object of adulterating the butter. The natural colour of margarine is such that it could not possibly be palmed off upon the consumer as butter is therefore artificially coloured, and the deception is complete. Similarly old butter would not and could not realise as much as fresh butter without the assistance of chemical preservatives quite apart from the fact that no material change in the value has taken place since it was manufactured. It is therefore that buyers would not be willing to pay so much for butter containing chemicals as for that which is pure. We desire to know what we are eating, and if it is really not pure, to add drugs to our food, let us do it ourselves. It is a worthy fact, that since the accession to power of the Minister of Agriculture, large numbers of samples of butter have been taken with the result that German and Dutch butter have been found to be adulterated. It is therefore surprising that margarine, the legal term for butter adulterated with a foreign fat, is found upon the tables of the first class hotels. A very competent expert has publicly expressed



lief that 25 per cent. of the butter imported is margarine; it might be added that a large proportion of that produced at home is equally impure. I have it from the lips of a factory owner, at least, in order to make both ends meet, he is compelled to blend cheap imported butter with the butter he produces, and he insists that the trade is aware how impossible it is for himself and others similarly engaged to pay the market price for milk, and to sell the butter produced from it to compete with that which is imported. That the French are among the most frequent offenders has been admitted by the President of the French Committee of the Legislature on Margarine, who pointed out that French butter, containing from 15 to 35 per cent. of foreign fat, was shipped to England. Whether the margarine makers, or the butter merchants abroad are the most to blame, I am unable to determine, but I have had opportunities of inspecting some of the first margarine factories in existence, among them some in this country, and of examining samples and mixtures, about the quality and value of which no experts would have any doubt. The makers of these mixtures, which are sold as high class, and are so skilfully concocted that detection becomes impossible, would appear to be no more to blame as the retailers, who, with the impudence which is begot by practised fraud, unblushingly sell them as pure butter; indeed, the belief has been expressed to me in one of these factories that the best mixtures *are* sold as butter. There is, however, another reason for supposing that the system is as carefully designed as it is systematically carried out. I have seen in one of the largest factories considerable numbers of packages of every known form and shape adopted in the butter trade. That many of the traders who buy cheap butters from abroad are ignorant of their character, I cannot believe; at least they are willing to stretch a point of conscience in favour of a point of profit appears to be much more likely. Be that as may, there are plenty of receivers but for whose assistance the large producers of fraudulent goods would not be able to give their prosperous trades.

Details with regard to the laws which exist in other countries, in connection with margarine, have been given in evidence, but there is hardly one country in which the law is more unpractical than in our own. The Danish law has almost killed the trade in spurious butter; the Swedish law has been almost successful; while in many of the States of America, the manufacture, as well as the sale, of margarine is prohibited; or, if sale is permitted, it must be sold uncoloured, of a specific colour, or under such conditions as prevent the perpetration of fraud. A dozen years ago the margarine produced in New York State in

one year amounted to 15 million lbs. We were informed by the Assistant Commissioner, who has done more than anyone to suppress the trade, that two years ago there was no margarine produced in the State. The English law will, however, never be carried so far as this, inasmuch as good margarine is recognised as sound food, and especially valuable to the poor in consequence of its cheapness; but *the poor are the people who are being defrauded*. It is urged that if the law prohibits the colouring of margarine and its admixture with butter, the price of butter will be increased. This is probably true, but such an increase would not affect the pocket of the poorest consumer. If even this were not the case, it would be no argument, inasmuch as prices are depressed by fraud. Assuming that a mixture sold as butter is to-day realising 14d. per lb., and that by a change in the law the price of butter is raised from 14d. to 16d., it will appear that the butter consumer is taxed to the extent of 2d. per lb. for the sake of maintaining vigorous adulteration laws. Those persons, however, who have been accustomed to buy 14d. mixtures under the name of butter, could still follow the example of the Danes, and buy their margarine and their butter separately, and make their mixtures at home, effecting a saving of 33 per cent. It was admitted in evidence by Mr. Bannister, of Somerset House, that the composition of "butter," as regards the foreign fat it contains, could not be determined with absolute accuracy, chiefly in consequence of the variation in the composition of pure butter itself. The same gentleman referred to the difficulty which arises in the case of butter which has been kept for some time and in which the insoluble fatty acids have been increased, and the soluble fatty acids diminished in consequence, bringing their proportions closer to the percentage of these acids in margarine. Duclaux, perhaps the first authority in France has shown that 19 per cent. of margarine can be mixed with the pure butters of Isigny, and yet, upon analysis, the mixture would be found to correspond in composition with pure butter. He has shown by a number of analyses of French butters that the range of volatile fatty acids is from 2.5 up to 7 per cent. and that the average is 5.63 per cent. As margarine contains only about 1 per cent. of these fatty acids, it follows that pure butter containing a high percentage may be adulterated largely. This, however, is upon the assumption, which seems to be accepted by some chemists, that no better method of determination has yet been adopted.

The employment of water is a most serious form of adulteration. It has been shown by the Somerset House chemists that some German butters contain 20 per cent. of water, as well as

from 20 to 40 per cent. of margarine; while, on the other hand, with the Somerset House and the public analysts have shown that New Zealand butters sometimes contain less than 10 per cent. of water. In almost all countries there is a consensus of opinion that butters should not, and need not, contain more than 15 to 16 per cent. of water at the outside; but in Ireland a different spirit is shown, chiefly in consequence of the belief that it is essential to pickle butter, as it is termed, to enable it to keep, and that pickling is followed by a high percentage of water. It is further urged by some Irishmen that the small peasant farmer of the South, who makes his butter upon primitive principles with imperfect appliances or accommodation, should be protected. In the first place, a proposal to make a loose law—through which all the world may drive—simply because a small section of Irishmen are unable or unwilling to do what is done with more or less perfection by farmers of a similar class in every other country, can scarcely be entertained. On the other hand, if pickling necessarily imparts to butter a higher percentage of water than is consistent with the practice of advanced butter-making, or with the need for a costly food, I should willingly support a proposal to place such butter upon a different basis. But those who have given time and thought to the question are well aware that there is no such necessity. The addition of water is a form of adulteration and should never exceed 15 per cent., while even the Somerset House authorities, who have no standard, and who usually err on the side of sophistication, state that the range of water in fresh butter is from 12 to 14 per cent., and that in salt butter it only reaches 16 per cent. or a little higher. The average percentage of water in English butter is 11·12 per cent., that of the French fresh butter 13·9 per cent., and of the French salt butter 12·5 per cent.; of Danish butter 13·2 per cent., and of Australian 11·5 per cent.; these figures being based upon a large number of analyses which were made a few years ago by Dr. Vieth, while Dr. Fleischman, a great German authority, gives 12 per cent. for unwashed and 12½ per cent. for washed butter. It may be remarked that the appearance of butter is not always a guide to its water contents; if finely divided, a sample may be somewhat heavily adulterated and yet be apparently dry, and *vice versa*. It is possible to believe that the systematic consumption of butter containing such antiseptics as salicylic acid and boracic acid is not deleterious to health, especially where three grammes of the former are used to the pound, as is sometimes the case.

The special points, which it appears to me it is essential to

embody in any legislative measure for the suppression of in the sale of butter, are as follows:—

1. A standard providing what quantity of butter fat, if shall be permitted to be mixed with margarine when new is employed in the process of its manufacture.
2. The prohibition of mixing butter and margarine for s
3. The prohibition of colouring by artificial means.
4. The employment of packages of specified shape or co
5. The branding of every package employed for the co  
ance or reception of margarine.
6. Notification in bold letters on the premises in which  
garine is manufactured or sold.
7. The labelling of paper in which margarine is wr  
with letters of at least 1 inch by 1½ inches, in black or  
blue; the word "Margarine" alone to be used.
8. The examination of imported butter at the port of en
9. The inspection of margarine factories.
10. The sampling of margarine or butter without  
through the form of purchase at warehouses, shops, hotel  
restaurants.
11. Confiscation of adulterated goods.
12. Heavier fines; imprisonment for the fourth offence;  
lication in the newspapers after every conviction.
13. The appointment of inspectors under the Board of Ag  
ture for the purpose of seeing the law is thoroughly carri  
by Local Authorities.

#### CHEESE.

Very little need be said about adulterated cheese, wh  
not placed upon our markets in the same quantity as adult  
butter. The quantity manufactured, however, is consid  
and the large volume of separated milk which is placed  
disposal of factory owners will always prove too tempti  
some pushing spirits to resist. We have no moral ri  
prohibit the mixture of foreign fat with skim milk fo  
version into wholesome food, beneficial as an Act fo  
purpose might be to agriculture. But, as we have every  
to prevent its sale under fraudulent conditions, I thin  
n legislation the whole of the foregoing proposals whi  
plied to butter—the first three excepted—should be a  
n cheese, with an addition to the effect that cheese, to  
ny fat other than butter-fat is added in the process of  
facture, should be marked with an impressed brand at  
top and bottom, with the words "Margarine Cheese,"  
etter to be at least 1½ inches by ¾ inch. The letters  
be impressed upon the crust of the cheese; to mark it

mil would but be to invite an extension of the practice, I was informed by Montreal shippers, is adopted by pool buyers, who scrape off the brand upon the arrival of consignment.

mers in their own interest would be well advised to follow example of makers in some of the American States, and their own cheese "Full Cream." We have no Dairy mission in this country, otherwise it would be desirable to le for a national or county brand to be used under official l, as in America. Until we have such a Commission, we t expect to see the dairying industry conducted upon m or completely economical lines.

*The Production and Sale of Milk.* By Dr. J. A. VOELCKER, M.A., F.I.C., &c.\*

production is now one of the greatest industries con- l with agriculture, and the enormous proportions of that try can be realised when I mention that there are about nillion cows and heifers in milk in the United Kingdom e Channel Islands, and, on an average, the yield of each : 500 gallons per annum. The enormous imports of dairy ce from abroad have also to be taken into consideration. r comes in great quantities from Denmark and the Colonies, ompetes with our home produce; and cheese from Canada nargarine are also imported in bulk to this country. It e better understood what the extent of this importation en I say that in 1891 the quantity of butter thus brought competition with home produce was 2,135,607 cwts., in 1894 2,576,063 cwts. The value of these imports in 1891 11,591,183*l.*, and in 1894 13,470,419*l.* Of , in 1891 there was received 2,041,325 cwts., and in 2,263,287 cwts. The value of this cheese in 1891 was 404*l.*, and in 1894 5,467,137*l.* Not only has there been reat increase of late years in the importations, but there so been a very great improvement in the quality of the cts sent to this country. Canadian cheese especially has uch improved, and Danish butter is now of very excellent iform quality. When this butter is compared with the lots of uneven quality and appearance coming from sh farms it is not a matter of surprise that the consuming

mmmary of a Lecture delivered on May 31st, 1895, in the Working Dairy, Society's Taunton Meeting.

public prefer it. Of late years, milk has been imported into this country, and large quantities are now coming from France.

With reference to what milk is, I hold that it is not necessary that it should be *anything* that comes from the cow, but that it is the fluid which is drawn from a healthy and well-fed cow. It is a matter of which farmers should take particular notice in sending out their supplies to the consuming public—it is of the greatest importance in the feeding of children. The quality of milk is affected by different causes, the greatest variation being due to the breed of the cow. Jerseys are a butter-producing breed, and in this respect excel all others. If you take milk from a Jersey and stand it beside that from a Shorthorn, the cream will be seen to rise more quickly in the former. The ascertained cause of this is that the milk from a Jersey contains larger fat globules than that from a Shorthorn. The Jersey is essentially a dairy cow, but the Shorthorn when it is done up as a milking animal is also good for beef. The Ayrshire is the best breed for producing milk for cheese, because the milk is more distributed throughout the mass of the milk, the milk globules being smaller it is consequently not so well adapted to the Jersey for butter-making. The Red Polled breed has come into prominence lately, and so also has the Devon cow, which produces rich milk, but in smaller quantity than the others. The Kerry is, by common consent, no longer regarded as a “fancy” animal, the quantity of milk and butter being large when the size of the animal is taken into consideration. The Kerry also thrives without very much sustenance, and will give rich milk when any other cow would starve. The Dutch cow gives large quantities of milk, but the milk is of very poor quality. The breed is, however, valuable for other purposes, as has been proved by experience. I have recently seen this at the Home Farm of Lord Egerton of Tatton, where a large number of Dutch cows are kept, and where great quantities of milk are derived by crossing them with Shorthorns.

As to the feeding of milk-producing cattle, you must vary beyond certain limits the quality of milk by the quality of food. You may feed a Jersey as much as you like, but you can never get very different results; and, however much you may feed a Shorthorn you can never get milk of equal quality to that of the Jersey. The one point in which the greatest variation is in the proportion of butter-fat. The best food for cows is undoubtedly pasture, which, if good, will support cows very well, while, if poor, it should be supplemented by artificial food. Cabbages, carrots, silage, and other succulent foods can be used to good purpose for keeping up a continuous flow of milk. In the matter of *pasture*

have an advantage over the Germans, who have practically no pasturage, and feed their cows in an artificial way, driving them out of the herd and fattening them off as soon as they fail to give the requisite yield.

As to the condition of the pasturage, if the milk-making contents are wanting, they should be replaced by means of manure, n, phosphates, and lime. I cannot say under what condition one manure is better than another, for this is a matter to be decided in connection with the nature of the soil and the climate. I believe that in Devon and in certain other parts of the country the farmers prefer dissolved bones, and large sums of money are annually spent upon them. I should not like to say that this is wrong, but in Cheshire every one believes in raw bones; while in Warwickshire they use raw bones. It is therefore a difficult question to decide which is right. But as experience has shown that certain manures are good, it is better to adopt the practice as a dictum, and chemists rightly whenever they can. It is well for the farmer, when he has a choice of manure in which he has faith, to leave a strip of land unmanured, so that he may see whether or not he has gained by manuring. He will thus learn more about the actual conditions of his particular land than he can from the reports of chemical chemists. It is largely from experienced farmers that we get their most useful information.

A cow is at her best when she is between four and eight years old. The Shorthorn will, at six years old, give 16 quarts per day; and after that age will go on yielding up to 20 quarts. A Friesian at six years of age gives 10 quarts, and when over seven years 12 quarts, and the latter is milk of better quality. We are much affected in their milk supplies by calving, and have calculated that from a herd of twenty-five Shorthorn cows the average quantity of milk per cow is as follows:—One month after calving, 18 quarts; and, after that, month by month, 12½, 9½, 8, 6, 4½, 3 quarts respectively, and 2 quarts at the seventh month. It is no use making comparisons with other breeds of cows, as the variations due to the different causes mentioned are so great. One frequently sees experiments of this kind reported, but they are not worth the paper on which they are written, and I hope no one will be led away by the results of such experiments.

It is a mistake to suppose that typhoid fever is conveyed to man through the cow drinking foul water; but if pails are dirty when disease germs are about, the germs can be conveyed into the milk. In this way scarlet fever may be conveyed to the consumer. In all well-regulated dairy schools, cleanliness is taught as one of the most important matters.

I hold no brief for large dairy companies, but I must say that I consider that, as many of them have their regular medical officers, who inspect the cows, and look after the health of the employés on their farms, the system is to be preferred to that of the retail dealers in shops.

I must protest against the use of preservatives in milk, for these affect the digestive organs of children without the mother having any knowledge of it till too late.

With reference to the railway carriage of milk, it is in some parts of the country conveyed under conditions very unfavourable to the farmers, inasmuch as the cans have to be left open for inspection, and in this way there is no guarantee that a consignment has not been tampered with on the road.

With regard to the prospects of the great dairy industry, a large amount of good is being done by the dissemination of every kind of knowledge concerning it; but the fact must be more and more impressed upon the English farmer that Great Britain is not dependent on him for all its supplies. Farmers must learn to send out large rather than small consignments, and those of more uniform quality than at present. In short, they must become better business-men.

#### VIII.—*Fat in Skim Milk.* By C. T. D. ACLAND.

IN the last-issued volume of the Society's Annual 'Journal, under the heading 'Some Experiments in Dairying,' the results were given of an examination by Mr. F. J. Lloyd, F.I.C., &c., of raw and scalded skim milk, with a view of ascertaining the amount of fat respectively left in each. The examination was continued during the past year by Mr. Lloyd, to whom once month I sent a two-ounce phial filled with skim milk which has been scalded before skimming, and another with skim milk which had been skimmed without scalding. It need hardly be said that the whole of the milking was always well mixed before setting; that the ordinary process was followed in each case; and that the depth of the milk in each pan when set was the same; the pan for the raw milk having vertical sides, as that for the scald being the ordinary-shaped pan used for that purpose. The temperature of the dairy was in most cases recorded, but not in all, partly on account of the absence from some. Two grains of salicylic acid in each phial were added as a preservative. The following table gives the results of the analyses:—



FAT IN SCALD AND RAW SKIM MILK.

|               | Temperature<br>Fabr. | Percentage of Fat. |      |
|---------------|----------------------|--------------------|------|
|               |                      | Scald.             | Raw. |
| 1895.         |                      |                    |      |
| ary 5 .. ..   | 34                   | ·51                | ·26  |
| 14 .. ..      | 40                   | ·43                | ·31  |
| 10 .. ..      | 50                   | ·38                | ·25  |
| 5 .. ..       | 56                   | ·12                | ·09  |
| 11 .. ..      | 61                   | ·38                | ·32  |
| 3 .. ..       | 60                   | ·20                | ·51  |
| st 16 .. ..   | 59                   | ·62                | ·26  |
| ber 20 .. ..  | ..                   | ·83                | ·71  |
| 30 .. ..      | 53                   | ·08                | ·26  |
| ber 3 .. ..   | 45                   | ·50                | ·44  |
| 1896.         |                      |                    |      |
| ry 11 .. ..   | 40                   | ·71                | ·58  |
| ary 3 .. ..   | 40                   | ·50                | ·31  |
| Average .. .. | ..                   | ·44                | 36   |

ires again vary considerably, which is probably due to the cream getting mixed with the skim milk when was being drawn off for sampling. The irregularity vildering that a new method of withdrawing the skim the least possible disturbance has been adopted. At inference can be drawn that would be of any real re examination will, however, be carried on for elve months in the hope of obtaining more uniform ich will point to a definite conclusion in one direction r.

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*he Society's Dairy Schools.* By THOS. F. FLOWMAN,  
Secretary and Editor.

e of the instruction, the methods of procedure, and nces used at the Society's Dairy Schools, having been t with in previous issues of the Society's 'Journal,' it ecessary now to add to the statistics of former years ulars with reference to the immediate past.  
re establishment of its Schools in 1888, and up to 1895, the Society had, in conjunction with County and other public bodies for whom it had acted, ex- sum of 18,413*l.* in the promotion of Technical n in Dairying through the medium of these Schools.

That sum, however, by no means represents the total exp<sup>r</sup>ture in connection with these Schools, for it does not include cost of hiring and fitting up buildings for the travelling F Schools, and other local liabilities undertaken by other b<sup>s</sup> such as the District Committees, co-operating with the Soc

### BUTTER SCHOOLS.

At the request, and at the cost, of the County Com<sup>s</sup> of Somerset and Devon, the Society during 1895 cond<sup>d</sup> travelling Butter Schools in those counties. Particulars ( expenditure in connection therewith will be found on cxv and cxvi of the Appendix to this volume.

The instruction has been given by the Society's Tea Misses N. Angus, A. A. Benjafield, M. S. Benjafield M. Smart; and practical addresses have been deliver<sup>d</sup> each class of Students by the Society's Dairy Steward G. Gibbons), who personally supervises the Schools.

It is satisfactory to be able to state, that those who lc<sup>d</sup> dairying for a livelihood, and for whom the instruction i<sup>s</sup> marily intended, have not failed to take advantage of it.

The accompanying tabular statement shows the num<sup>b</sup> Students who have attended the Butter Schools at each v<sup>s</sup>ited up to December 31, 1895.

### BUTTER SCHOOLS

Conducted by the SOCIETY from October 15, 1888, to Decembe<sup>r</sup> 1895.

| County.            | Centre.            | No. of days School was open. | Year. | No. of Stud <sup>s</sup> |                  |
|--------------------|--------------------|------------------------------|-------|--------------------------|------------------|
|                    |                    |                              |       | 10 days.                 | Shorter periods. |
| Brecknockshire ..  | Builth .. ..       | 7                            | 1890  | ..                       | 14               |
| Devon .. ..        | Exeter .. ..       | 21                           | 1889  | 22                       | 3                |
| .. ..              | Barnstaple .. ..   | 11                           | 1893  | 4                        | 1                |
| .. ..              | Bideford .. ..     | 11                           | ..    | 8                        | 2                |
| .. ..              | Colyton .. ..      | 11                           | ..    | 12                       | ..               |
| .. ..              | Exeter .. ..       | 11                           | ..    | 5                        | 5                |
| .. ..              | Hatherleigh .. ..  | 21                           | ..    | 16                       | 2                |
| .. ..              | Merton .. ..       | 11                           | ..    | 18                       | 1                |
| .. ..              | South Molton .. .. | 11                           | ..    | 8                        | 8                |
| .. ..              | Tiverton .. ..     | 21                           | ..    | 22                       | 3                |
| .. ..              | Torrington .. ..   | 21                           | ..    | 18                       | 1                |
| .. ..              | Ashburton .. ..    | 21                           | 1894  | 18                       | 2                |
| .. ..              | Axminster .. ..    | 21                           | ..    | 17                       | 1                |
| .. ..              | Crediton .. ..     | 11                           | ..    | 12                       | ..               |
| Carried forward .. |                    | 210                          | ..    | 175                      | 43               |

BUTTER SCHOOLS—continued.

| County.               | Centre.                  | No. of days School was open. | Year. | No. of Students. |                  |        |
|-----------------------|--------------------------|------------------------------|-------|------------------|------------------|--------|
|                       |                          |                              |       | 10 days.         | Shorter periods. | Total. |
|                       | Brought forward ..       | 210                          | ..    | 175              | 43               | 218    |
| Devon .. ..           | Cullompton .. ..         | 31                           | 1894  | 35               | ..               | 35     |
| " .. ..               | Fairmile .. ..           | 31                           | "     | 20               | 5                | 25     |
| " .. ..               | Honiton .. ..            | 21                           | "     | 15               | 2                | 17     |
| " .. ..               | Killertou .. ..          | 21                           | "     | 18               | 5                | 23     |
| " .. ..               | Kingsbridge .. ..        | 21                           | "     | 13               | ..               | 13     |
| " .. ..               | Plympton .. ..           | 11                           | "     | 9                | 2                | 11     |
| " .. ..               | Totnes .. ..             | 11                           | "     | 7                | 5                | 12     |
| " .. ..               | Okehampton .. ..         | 11                           | 1895  | 11               | 1                | 12     |
| " .. ..               | Holsworthy .. ..         | 31                           | "     | 34               | ..               | 34     |
| " .. ..               | Colaton Raleigh .. ..    | 21                           | "     | 24               | ..               | 24     |
| " .. ..               | South Molton .. ..       | 11                           | "     | 9                | ..               | 9      |
| " .. ..               | Exmouth .. ..            | 11                           | "     | 10               | 1                | 11     |
| " .. ..               | Bampton .. ..            | 21                           | "     | 23               | ..               | 23     |
| " .. ..               | Oakford .. ..            | 11                           | "     | 11               | 3                | 14     |
| " .. ..               | Woodbury .. ..           | 21                           | "     | 18               | ..               | 18     |
| " .. ..               | Kenton .. ..             | 11                           | "     | 8                | 4                | 12     |
| " .. ..               | Starcross .. ..          | 11                           | "     | 6                | 3                | 9      |
| " .. ..               | Hatherley .. ..          | 11                           | "     | 8                | ..               | 8      |
| Dorset .. ..          | Bridport .. ..           | 21                           | 1890  | 26               | ..               | 26     |
| " .. ..               | Fontmell Magna .. ..     | 11                           | 1891  | 12               | ..               | 12     |
| " .. ..               | Portesham .. ..          | 21                           | 1892  | 24               | ..               | 24     |
| " .. ..               | Maiden Newton .. ..      | 21                           | "     | 23               | ..               | 23     |
| " .. ..               | Bridport .. ..           | 11                           | "     | 11               | 1                | 12     |
| " .. ..               | Charmouth .. ..          | 21                           | "     | 16               | ..               | 16     |
| " .. ..               | Buckland Newton .. ..    | 21                           | "     | 14               | ..               | 14     |
| " .. ..               | Sherborne .. ..          | 11                           | 1893  | 11               | ..               | 11     |
| " .. ..               | Leigh .. ..              | 11                           | "     | 11               | 9                | 20     |
| " .. ..               | Lydlinch .. ..           | 11                           | "     | 12               | 1                | 13     |
| " .. ..               | Alveston .. ..           | 11                           | "     | 12               | ..               | 12     |
| " .. ..               | Stower Provost .. ..     | 11                           | "     | 12               | 4                | 16     |
| " .. ..               | Gillingham .. ..         | 21                           | "     | 19               | 1                | 20     |
| " .. ..               | Blandford St. Mary .. .. | 11                           | "     | 4                | 22               | 26     |
| " .. ..               | West Stafford .. ..      | 11                           | "     | 7                | 4                | 11     |
| " .. ..               | Upwey .. ..              | 11                           | "     | 8                | 5                | 13     |
| " .. ..               | Winfrith .. ..           | 11                           | "     | 11               | 3                | 14     |
| " .. ..               | Corfe Castle .. ..       | 11                           | "     | 10               | 2                | 12     |
| " .. ..               | Wareham .. ..            | 21                           | "     | 23               | 3                | 26     |
| " .. ..               | Holt .. ..               | 21                           | "     | 21               | 3                | 24     |
| " .. ..               | Horton .. ..             | 11                           | "     | 9                | 1                | 10     |
| Gloucestershire .. .. | Berkeley .. ..           | 11                           | 1889  | 9                | ..               | 9      |
| " .. ..               | Gloucester .. ..         | 21                           | "     | 20               | 6                | 26     |
| Herefordshire .. ..   | Bromyard .. ..           | 11                           | 1891  | 10               | ..               | 10     |
| " .. ..               | Kington .. ..            | 11                           | "     | 4                | 15               | 19     |
| " .. ..               | Hereford .. ..           | 21                           | "     | 21               | 5                | 26     |
| " .. ..               | Ledbury .. ..            | 11                           | "     | 12               | 4                | 16     |
| " .. ..               | Leominster .. ..         | 11                           | "     | 8                | 4                | 12     |
| " .. ..               | Ross .. ..               | 11                           | "     | 9                | 1                | 10     |
| Kent .. ..            | Tonbridge .. ..          | 21                           | 1892  | 12               | 11               | 23     |
| " .. ..               | Westerham .. ..          | 11                           | "     | 11               | 3                | 14     |
|                       | Carried forward ..       | 979                          | ..    | 866              | 182              | 1048   |

BUTTER SCHOOLS—*continued.*

| County.          | Centre.              | No. of days School was open. | Year. | No. of S |         |
|------------------|----------------------|------------------------------|-------|----------|---------|
|                  |                      |                              |       | 10 days. | Sbs per |
|                  | Brought forward ..   | 979                          | ..    | 866      | 18      |
| Kent .. .. .     | Igham or Wrotham ..  | 11                           | 1892  | 6        |         |
| .. .. .          | Maidstone .. ..      | 10                           | 1893  | 1        |         |
| .. .. .          | Cranbrook .. ..      | 11                           | ..    | 10       | 1       |
| .. .. .          | Tenterden .. ..      | 11                           | ..    | 10       |         |
| .. .. .          | Ashford .. ..        | 31                           | ..    | 20       |         |
| .. .. .          | Hythe .. ..          | 21                           | ..    | 17       |         |
| .. .. .          | Dover .. ..          | 11                           | ..    | 4        |         |
| .. .. .          | Sandwich .. ..       | 11                           | ..    | 8        |         |
| .. .. .          | Swanley .. ..        | 31                           | ..    | 32       |         |
| .. .. .          | Canterbury .. ..     | 31                           | ..    | 19       |         |
| .. .. .          | Gravesend .. ..      | 11                           | ..    | 7        |         |
| .. .. .          | West Wickham ..      | 21                           | ..    | 18       |         |
| Middlesex ..     | Hampstead .. ..      | 21                           | 1889  | 24       |         |
| Oxfordshire ..   | Oxford .. ..         | 21                           | ..    | 20       |         |
| Pembrokeshire .. | Pembroke .. ..       | 31                           | 1890  | 45       |         |
| Radnorshire ..   | Llwyn Madoc ..       | 7                            | ..    | ..       |         |
| .. .. .          | Newbridge-on-Wye ..  | 7                            | ..    | ..       |         |
| .. .. .          | Rhayader .. ..       | 21                           | ..    | 20       |         |
| Somerset .. ..   | Shepton Mallet ..    | 31                           | 1888  | 32       |         |
| .. .. .          | Clevedon .. ..       | 21                           | 1889  | 27       |         |
| .. .. .          | Yeovil .. ..         | 21                           | 1891  | 21       |         |
| .. .. .          | Crewkerne .. ..      | 21                           | ..    | 17       |         |
| .. .. .          | Langport .. ..       | 21                           | ..    | 19       | 1       |
| .. .. .          | Williton .. ..       | 11                           | ..    | 6        |         |
| .. .. .          | Minehead .. ..       | 11                           | ..    | 12       |         |
| .. .. .          | Chard .. ..          | 21                           | ..    | 12       |         |
| .. .. .          | Taunton .. ..        | 31                           | ..    | 26       |         |
| .. .. .          | Weston-super-Mare .. | 21                           | ..    | 20       |         |
| .. .. .          | Axbridge .. ..       | 21                           | ..    | 11       |         |
| .. .. .          | Glastonbury .. ..    | 21                           | 1892  | 16       |         |
| .. .. .          | Highbridge .. ..     | 21                           | ..    | 16       |         |
| .. .. .          | Midsomer Norton ..   | 21                           | ..    | 19       |         |
| .. .. .          | East Harptree ..     | 21                           | ..    | 17       |         |
| .. .. .          | Bath .. ..           | 31                           | ..    | 34       |         |
| .. .. .          | Wells .. ..          | 21                           | ..    | 20       |         |
| .. .. .          | Nailsea .. ..        | 31                           | ..    | 29       |         |
| .. .. .          | Keynsham .. ..       | 21                           | ..    | 21       |         |
| .. .. .          | Somerton .. ..       | 21                           | ..    | 21       |         |
| .. .. .          | Wincanton .. ..      | 21                           | 1893  | 21       |         |
| .. .. .          | Dulverton .. ..      | 21                           | ..    | 21       |         |
| .. .. .          | Wiveliscomb ..       | 21                           | ..    | 15       |         |
| .. .. .          | Milverton .. ..      | 11                           | ..    | 11       |         |
| .. .. .          | Wellington .. ..     | 11                           | ..    | 8        |         |
| .. .. .          | Cannington .. ..     | 11                           | ..    | 10       |         |
| .. .. .          | Martock .. ..        | 21                           | ..    | 14       |         |
| .. .. .          | Dunkerton .. ..      | 11                           | ..    | 7        |         |
| .. .. .          | Batheaston .. ..     | 11                           | ..    | 8        |         |
| .. .. .          | Cannington .. ..     | 11                           | ..    | 7        |         |
| .. .. .          | Clutton .. ..        | 11                           | ..    | 8        |         |
|                  | Carried forward ..   | 1899                         | ..    | 1633     | 354     |

BUTTER SCHOOLS—continued.

| County.    | Centre.            | No. of days School was open. | Year. | No. of Students. |                  |        |
|------------|--------------------|------------------------------|-------|------------------|------------------|--------|
|            |                    |                              |       | 10 days.         | Shorter periods. | Total. |
|            | Brought forward .. | 1899                         | ..    | 1653             | 354              | 2007   |
| Derbet     | Frome .. .. .      | 11                           | 1893  | 13               | 4                | 7      |
| "          | Bruton .. .. .     | 21                           | "     | 17               | 1                | 18     |
| "          | Queen Camel ..     | 11                           | "     | 8                | ..               | 8      |
| "          | Banwell .. .. .    | 21                           | 1894  | 14               | 2                | 16     |
| "          | Clevedon .. .. .   | 21                           | "     | 18               | ..               | 18     |
| "          | Henstridge .. .    | 21                           | "     | 21               | ..               | 21     |
| "          | Langford .. .. .   | 21                           | "     | 21               | 6                | 27     |
| "          | Langport .. .. .   | 11                           | "     | 4                | ..               | 4      |
| "          | Nailsea .. .. .    | 21                           | "     | 24               | ..               | 24     |
| "          | Portbury .. .. .   | 31                           | "     | 32               | ..               | 32     |
| "          | Radstock .. .. .   | 21                           | "     | 18               | ..               | 18     |
| "          | Wellow .. .. .     | 21                           | "     | 17               | ..               | 17     |
| "          | Wick St. Lawrence  | 21                           | 1895  | 14               | 1                | 15     |
| "          | Blagdon .. .. .    | 11                           | "     | 3                | 2                | 5      |
| "          | Chew Magna .. .    | 21                           | "     | 22               | ..               | 22     |
| "          | Dundry .. .. .     | 21                           | "     | 19               | 1                | 20     |
| "          | Yeovil .. .. .     | 21                           | "     | 24               | ..               | 24     |
| "          | Wellow .. .. .     | 11                           | "     | 12               | ..               | 12     |
| "          | Timsbury .. .. .   | 21                           | "     | 17               | ..               | 17     |
| "          | Shepton Mallet ..  | 21                           | "     | 18               | 6                | 24     |
| "          | Mells .. .. .      | 11                           | "     | 8                | 2                | 10     |
| "          | Marksbury .. .     | 21                           | "     | 21               | 1                | 22     |
| "          | Newton St. Loo ..  | 11                           | "     | 9                | ..               | 9      |
| "          | Twerton .. .. .    | 11                           | "     | 6                | ..               | 6      |
| "          | Upper Weston ..    | 21                           | "     | 16               | 3                | 19     |
| y          | Oxford .. .. .     | 21                           | 1891  | 22               | ..               | 22     |
| "          | Lingfield .. .. .  | 11                           | "     | 13               | ..               | 13     |
| "          | Horley .. .. .     | 11                           | "     | 12               | ..               | 12     |
| "          | Chobham .. .. .    | 11                           | "     | 12               | 2                | 14     |
| "          | Leatherhead .. .   | 11                           | 1892  | 4                | ..               | 4      |
| "          | Dorking .. .. .    | 11                           | "     | 6                | 3                | 9      |
| "          | Guildford .. .. .  | 21                           | "     | 9                | 8                | 17     |
| x          | Steyning .. .. .   | 7                            | 1890  | ..               | 15               | 15     |
| Wickshire  | Coventry .. .. .   | 21                           | 1889  | 22               | 7                | 29     |
| shire      | Swindon .. .. .    | 21                           | 1888  | 21               | 11               | 32     |
| "          | Chippenham .. .    | 31                           | 1889  | 36               | 8                | 44     |
| estershire | Worcester .. .. .  | 21                           | 1890  | 24               | 6                | 30     |
|            |                    | 2552                         | ..    | 2220             | 443              | 2663   |

CHEESE SCHOOL.—PRACTICAL-INSTRUCTION SECTION.

The practical-instruction section of the School has been ordered on by the Society on behalf, and at the cost, of the Derbet County Council.

The School was held during 1895 at Haselbury, near Crewkerne, upon the estate of the then President of the Society (Lieut. Portman), the occupier of the farm and premises

being Mr. G. D. Templeman. The usual arrangements were made with the tenant for the use and control of his dairy, supply of milk from his cows, and the boarding and lodging of Students in his house. The School was opened on April 1 and closed on October 31.

The School was supervised by Mr. G. Gibbons, and, as in previous years, the instruction was given by Miss E. J. Canham. The Society had also the advantage of the advice and experience of Mr. H. Cannon, of Milton Clevedon.

For purposes of comparison, the amount of Cheese made at the Society's five Schools, and the prices realised, are given in the following table. Messrs. Hill Bros., of Evercreech, were the buyers, and the quantity sold included the entire output.

AMOUNT OF CHEESE MADE AND PRICES REALISED.

| Date. | Place.    | Number of Draft.                                   | Weight.        | Total weight.  | Price per 112 lbs. | 1 |
|-------|-----------|--|----------------|----------------|--------------------|---|
|       |           |  | cwt. qrs. lbs. | cwt. qrs. lbs. | s. d.              | 8 |
| 1890  | Wells     | First (May 1 to 31) .. ..                          | 37 1 12        | 198 1 7        | 61 6               | 2 |
| "     | "         | Second (June 1 to July 20)                         | 35 2 2         |                | 66 6               |   |
| "     | "         | Third (July 21 to Aug. 31)                         | 21 2 19        |                | 66 6               |   |
| "     | "         | Fourth (Sept. 1 to Oct. 31)                        | 103 3 2        |                | 67 6               |   |
| 1891  | Frome     | First (Apr. 1 to May 11) ..                        | 26 2 17        | 176 1 13       | 54 0               | 2 |
| "     | "         | Second (May 12 to June 11)                         | 33 1 17        |                | 65 0               |   |
| "     | "         | Third (June 12 to Aug. 11)                         | 57 1 24        |                | 66 0               |   |
| "     | "         | Fourth (Aug. 12 to Oct. 31)                        | 57 0 0         |                | 66 0               |   |
| "     | "         | Fifth (half-skim Cheese)<br>(Nov. 1 to Nov. 15) .. | 1 3 11         |                | 50 0               |   |
| 1892  | Axbridge  | First (April 1 to 30) .. ..                        | 17 2 7         | 166 1 20       | 58 0               | 2 |
| "     | "         | Second (May 1 to 31) .. ..                         | 26 0 17        |                | 65 0               |   |
| "     | "         | Third (June 1 to Aug. 18)                          | 58 3 6         |                | 68 0               |   |
| "     | "         | Fourth (Aug. 19 to Sept. 30)                       | 40 1 3         |                | 70 0               |   |
| "     | "         | Fifth (Oct. 1 to Oct. 31) ..                       | 23 2 15        |                | 70 0               |   |
| 1893  | Butleigh  | First (April 1 to 30) .. ..                        | 23 3 23        | 205 1 3        | 60 0               | 2 |
| "     | "         | Second (May 1 to 31) .. ..                         | 33 3 9         |                | 66 0               |   |
| "     | "         | Third (June 1 to July 31)                          | 64 3 9         |                | 68 0               |   |
| "     | "         | Fourth (Aug. 1 to Sept. 30)                        | 51 1 0         |                | 68 0               |   |
| "     | "         | Fifth (Oct. 1 to Oct. 31) ..                       | 31 1 18        |                | 68 0               |   |
| 1894  | Mark      | First (April 1 to 30) .. ..                        | 25 1 0         | 214 0 24       | 60 0               | 2 |
| "     | "         | Second (May 1 to 30) .. ..                         | 35 0 15        |                | 63 0               |   |
| "     | "         | Third (June 1 to July 31)                          | 71 3 1         |                | 64 0               |   |
| "     | "         | Fourth (Aug. 1 to Sept. 30)                        | 49 1 24        |                | 65 0               |   |
| "     | "         | Fifth (Oct. 1 to Oct. 31) ..                       | 32 2 12        |                | 60 0               |   |
| "     | Haselbury | First (April 1 to 30) .. ..                        | 30 3 9         | 239 2 2        | 51 0               | 2 |
| "     | "         | Second (May 1 to 30) .. ..                         | 42 2 23        |                | 58 0               |   |
| "     | "         | Third (June 1 to July 30)                          | 75 2 26        |                | 58 0               |   |
| "     | "         | Fourth (Aug. 1 to Oct. 31)                         | 90 1 0         |                | 58 0               |   |

Sums of 12*l.* 16*s.* 1*d.* in 1891, 8*l.* 3*s.* 7*d.* in 1892, 12*l.* 13*s.* 6*d.*

1893, 11*l.* 16*s.* in 1894, and 14*l.* 7*s.* 5*d.* in 1895, were received for truckle cheeses and whey butter made at the Schools, and 13*l.* 10*s.* 6*d.* in 1895 for experimental cheese, in addition to the cheese referred to in the foregoing table.

The following table shows the number of Students at the Society's Cheese Schools :—

| County.     | Centre.         | No. of days School was open. | Year. | No. of Students. |          |          |          |         |                  |        |
|-------------|-----------------|------------------------------|-------|------------------|----------|----------|----------|---------|------------------|--------|
|             |                 |                              |       | 4 weeks.         | 3 weeks. | 2 weeks. | 10 days. | 1 week. | Shorter Periods. | Total. |
| Somerset .. | Wells .. ..     | 184                          | 1890  | 5                | 1        | 6        | ..       | 51      | 28               | 91     |
|             | Frome .. ..     | 229                          | 1891  | 12               | 1        | 12       | ..       | 32      | 9                | 66     |
|             | Axbridge .. ..  | 214                          | 1892  | 14               | ..       | 5        | 2        | 16      | 2                | 39     |
|             | Butleigh .. ..  | 214                          | 1893  | 24               | ..       | 3        | ..       | 15      | 2                | 44     |
|             | Mark .. ..      | 214                          | 1894  | 16               | ..       | 4        | ..       | 22      | 1                | 43     |
|             | Haselbury .. .. | 214                          | 1895  | 30               | ..       | ..       | ..       | 8       | 4                | 42     |
|             |                 | 1,269                        | ..    | 101              | 2        | 30       | 2        | 144     | 46               | 325    |

This year's Cheese School, which will be opened early in April, will be held at Cossington, near Bridgwater, at Truett's Farm, in the occupation of Mr. W. Tucker, under E. G. Broderip, Esq.

#### PRIZES FOR DAIRY STUDENTS.

At the Society's Annual Exhibition, which opens on May 27 at St. Albans, special prizes (particulars of which will be found on pages lxxxv., lxxxvi. of the Appendix to this volume) will be given for Cheese and Butter, made by Students who have attended any of the Society's Schools.

#### CHEESE SCHOOL.—EXPERIMENTAL SECTION.

The experimental section of the School, which was started by the Society in 1891, has been continued during 1895; a laboratory and a scientific expert (Mr. F. J. Lloyd, F.C.S.), with a qualified assistant, being attached to it. Detailed accounts of the work carried on there during the past year will be found elsewhere on in this volume.

The Board of Agriculture has frequently testified its appreciation of the researches conducted at the Cheese School by awarding monetary grants in aid of these, and by reprinting, in form of Parliamentary Reports, particulars of the observations made.

**X.—Observations on Cheddar Cheese-Making. Report for 1**  
**By F. J. LLOYD, F.C.S., F.I.C.**

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**I.—CONDITIONS UNDER WHICH THE CHEESES WERE MADE**

**(a.) THE DAIRY AND PASTURES.**

At the commencement of 1895 I was requested by the Society to continue the observations which for the previous four years had been made on the manufacture of Cheddar Cheese. The Cheese School last year was conducted on a farm occupied by Mr. G. D. Templeman, at Haselbury, about two miles from Crewkerne. The premises attached to Haselbury House were ample, and one of the rooms next the house was specially converted into a dairy, a new concrete floor being laid down, the walls plastered. There were no drains existing in the interior of the dairy, and those outside were most carefully covered and trapped. The room above the dairy was converted into a cheese-store. Ample light and ventilation were provided, and a covered room was constructed outside for the boiler, which supplied the steam required for the heating apparatus and for cleaning the utensils. The water, which was supplied from a well, was analysed by me on the 10th of June, and gave the following results, which show it to be pure and of excellent quality.



## WATER FROM CHEESE SCHOOL, HASELBURY.

| Per Imperial Gallon.              | Grains. |
|-----------------------------------|---------|
| Free (Saline) Ammonia .. ..       | ·001    |
| Albuminoid (Organic) Ammonia ..   | ·003    |
| Absorbs Oxygen .. ..              | ·010    |
| Total Solid Matter in Solution .. | 30·100  |
| Containing—                       |         |
| Organic matter .. ..              | 2·45    |
| Calcium Carbonate .. ..           | 22·40   |
| Calcium Chloride .. ..            | 1·13    |
| Magnesium Sulphate .. ..          | 2·01    |
| Magnesium Carbonate .. ..         | ·06     |
| Sodium Chloride .. ..             | ·87     |
| Alumina and Oxide of Iron ..      | ·14     |
| Nitric Acid .. ..                 | none    |
| Silicates .. ..                   | ·64     |

The dairy was large and the appliances were of the best, in fact the conditions were all that could be desired, yet—with a model dairy and an expert maker—there was not, during the whole period of seven months, a single cheese made which, in my opinion, could be said to be of excellent quality. Good cheeses were made as a rule, but in their manufacture an amount of difficulty was met with, such as would have disheartened most makers.

On no previous occasion have I sat down to write my Report of the Observations on Cheese-Making, feeling so strongly the difficulty of the task before me.

The farm attached to Haselbury House consists of 554 acres, of which 344 are arable, and 210 pasture. The farm is situated upon hilly ground, hence some of the fields lie somewhat high, while others are down in the valley. The water supply to the former consists of drinking-pools, but flowing through the latter were streams from which the cattle could drink at certain places.

On different parts of the farm which were down in grass, the soils varied slightly in appearance, so that I selected samples which, in my opinion, were typical of the whole and sent them to Dr. Voelcker for analyses. The following gives the result of his examination of these samples.

## REPORT OF DR. VOELCKER ON THE SOILS.

## SOILS DRIED AT 212° FAHRENHEIT.

|  | Soil No. 1.<br>North or<br>Middle<br>Solomons. | Soil No. 2.<br>Gamblins. | Soil No. 3.<br>Beet<br>Woods. |
|--|--|--------------------------|-------------------------------|
| *Organic matter, Carbonic acid, and<br>loss on heating .. .. . | 11·94  | 18·90                    | 13·13                         |
| Oxide of Iron .. .. .  | 3·80   | 4·35                     | 3·53                          |
| Alumina .. .. .  | 4·54   | 6·81                     | 7·92                          |
| †Lime .. .. .  | 1·20   | 1·27                     | 1·03                          |
| Magnesia .. .. .   | ·40  | ·53                      | ·46                           |
| Potash .. .. .   | ·34  | ·97                      | ·45                           |
| Soda .. .. .   | ·20  | ·44                      | ·11                           |
| Phosphoric acid .. .. .  | ·16  | ·16                      | ·16                           |
| Sulphuric acid .. .. .   | ·09  | ·17                      | ·14                           |
| Nitric acid .. .. .  | ..   | ·03                      | ·002                          |
| Insoluble siliceous matter .. .. .                             | 77·33  | 66·37                    | 73·07                         |
|  | 100·00   | 100·00                   | 100·00                        |
| *Containing nitrogen .. .. .                                   | ·22  | ·81                      | ·513                          |
| Equal to ammonia .. .. .                                       | ·27  | ·98                      | ·623                          |
| †Equal to carbonate of lime .. .. .                            | 2·14   | 2·27                     | 1·83                          |

No. 1. *North or Middle Solomons* was a light brown-c loam. It is the lightest of the four soils.

No. 2. *Gamblins* is darker coloured, and a heavier loam. It has rather more clay in it.

No. 3. *Beet Woods* is much like No. 2, but is rather lighter colour. It has flints interspersed in it.

No. 4. *Hams* is, in appearance, somewhat similar to No. 1. It has a good deal of flint in it.

The analyses show that No. 4 is a different soil to the other three, containing as it does considerably more lime.

As a whole, the soils are not anything like so rich in fertility as those at Mark Farm—the site of last year's experiment. They are, with one exception, poorer in potash and nitrogen, while all of them are markedly inferior in phosphoric acid to the Mark Farm soils.

In none of the four does the amount of phosphoric acid exceed an ordinary quantity for soils in fair agricultural condition.

No. 1 has a comparatively small percentage of potash and lime. As pasture-land, it is decidedly poor in nitrogen and in organic (vegetable) matter.

No. 2 has much more potash, and is also much richer in nitrogen, possessing, indeed, a high percentage of the latter constituent.

No. 3 has rather more potash than No. 1, but no great quantity, whereas it is well supplied with nitrogen.

No. 4 has plenty of potash and a fair quantity of nitrogen.

All four soils have abundance of lime.

I should consider No. 2 to be the richest and No. 1 the poorest soil.

For dairying purposes it would be an advantage to enrich the soils in phosphoric acid, while No. 1, at least, should have more nitrogen in the form of manure.

(Signed) J. AUGUSTUS VOELCKER.

The Committee also considered it advisable that Mr. Carruthers should go over the fields and investigate the herbage; which he did on the 22nd of July. He reported as follows:—

REPORT OF MR. WM. CARRUTHERS, F.R.S., ON THE PASTURES  
AT HASELBURY.

This farm, where the Cheese School is being carried on, contains different qualities of pasture due to the varieties of soil.

One is a rich alluvial soil, filling up the bottom of the valleys. This produces a large crop of good grasses, principally Cocksfoot and Hard Fescue; with these are small quantities of Rye-grass, Meadow Fescue, and Fiorin (*Agrostis vulgaris*). There is a fair amount of White Clover and a little Red Clover. Yarrow is fairly abundant. "Lower Haggett Meadows" and "Hazel Ditches" belong to this group. They are both clean and valuable pastures.

The fields "Middle and Lower Solomons" have a somewhat similar soil and a more varied vegetation. The principal grasses are Hard Fescue, Rye-grass, and Cocksfoot; the Hard Fescue is most abundant, and the other two follow closely after it. There is in addition a fair amount of Dog's-tail and Sweet Vernal, and a little Timothy. Here, as generally in the other fields in the farm, there is very little Clover. Yarrow is fairly abundant, and Ribwort is present.

The higher lands of the farm are covered with a thin soil, and are covered with a poor and starved pasture containing many weeds. The chief grasses are Hard Fescue and Rye-grass; there is a little Cocksfoot and scattered plants of other grasses. To this group belong the "Gravel Slate Field" and "Hanging Field."

The "Beet Woods Field" has a similar soil and position; the pasture is very much worse. It was laid down by a tenant about eight years ago, but nothing is known as to what kind of seeds he employed. It yields now a very poor starved grasses, and is full of weeds. It appears to me to have been laid down for a one or two years ley, and the show grasses as they disappeared have been replaced by sear grasses. The Rye-grass and the few plants of White Timothy, and Cocksfoot which are found in the field, are probably the remains of the original mixture, while the rest of the pasture, consisting of Bent-grass (*Fiorin*), Yellow Oat and Brome-grass are the produce of blown seeds.

In the lighter soils, but especially in the "Beet Woods Field," weeds abound. All the pastures would be improved by a little more White Clover.

(Signed) WILLIAM CARRUTHERS

26th July, 1895.

#### (b.) THE STOCK AND YIELD OF MILK.

On account of the size of the farm the stock are divided into two portions, so separated from one another that each is milked by separate milkers, and the milk brought in by different carts and trunks. In all there were, during the time, seventy cows, of which thirty were on the pastures in the valley, and forty on the hilly pastures. The form of milking as is usual in Somerset, milked in the fields, and for the sake of distinction I shall refer to them as the field herd; the lot were milked in a yard situated at and known as Wood, and will in future be referred to by this name.

The cows were well fed during the whole season, a supply of artificial food being given during the time when the yield of the pastures was insufficient. The herd was made up for the most part, of animals bred by Mr. Templeman, the cows known to be good milkers.

*Number of Cows.*—At the beginning of the season few cows were in milk. The weather being mild, they were sent to the pastures, but as the food was scanty, each animal received daily, in addition, four pounds of decorticated cotton-seed meal, two pounds of a mixture of bran, ground cotton seed (containing 23 per cent. oil), and barley meal. On the 16th of April silage was given to the cows. The use of artificial food was continued up to the 13th of May, being slightly varied during that period for reasons which will be referred to subsequently. On the 13th of May the cows were placed upon the pastures without additional food.

In the meantime the number of cows had increased. On the 9th of April five were added, making in all forty-six, and on the 23rd of April the number rose to fifty-three. No more were added until the 13th of May, when eleven, mostly heifers, were brought into the herd. Two were added on the 14th of May, two on the 21st, and finally two on the 29th, bringing the total number up to seventy. There was no variation in this number during the season up to the 22nd of September, after which a few cows were gradually withdrawn.

Towards the end of the season, on account of the drought, the cows also received artificial food.

*Milk Yield.*—The greatest quantity of milk was yielded on the 16th of May, and amounted to 198 gallons from sixty-six head of cattle, or exactly 3 gallons of milk per head. The average yield per head per day will be found in the table on page 99.

*Quality of the Milk.*—The effect of the high feed with artificials was to produce milk exceedingly rich in fat, containing during the month of April on an average 12·65 per cent. of total solids, with no less than 3·70 per cent. of fat. With the cessation of this supply of artificial food in May the composition of the milk fell, so that the average amount of total solids was only 12·58 per cent., containing 3·39 per cent. of fat. This result, however, was not entirely due to the influence of food, but partly to the increase in the number of cows, more especially of heifers. From the end of May the composition of the milk gradually improved, as it invariably does, and a reference to the following table, page 98, shows that the milk at Haselbury was richer than that yielded at any place where the Cheese School has been located, except at Vallis in 1891. There is one point about the composition of this milk which is of exceptional importance. While in April the milk contained no less than 3·70 per cent. of fat, due, I believe, to the high feed, yet this food appears to have had no effect upon the percentage of casein, which is almost exactly the same as has been found in previous years when the percentage of fat was low. Each month, however, the percentage of casein has risen as in former years. But the percentage of casein in the milk at Haselbury is as low as, and in most instances lower than, the percentage found in the milk at any of the Cheese Schools held during the preceding four years. The figures do not, in my opinion, permit of any satisfactory explanation being drawn from them. A careful examination of the following table will show that as a rule the casein increases with an increase of the fat. But at Haselbury it does not appear that the percentage of casein had any definite relation to the amount of fat, for while

in April the percentage of casein was only 2·43, in July it risen to 2·67, although the milk contained less fat. In 1 at the Axbridge School, we found that the percentage of ca was also low, so that it would appear to be due to localit season rather than to any fixed relation between the stituents of the milk. It is quite as likely to be due to season, or to some especial peculiarity of the stock, as it be dependent on the locality.

AVERAGE COMPOSITION OF MILK for each MONTH during th  
YEARS 1891-2-3-4-5.

| Month.    | Year. | Locality.        | Total Solids. | Fat. | Ca |
|-----------|-------|------------------|---------------|------|----|
| April .   | 1892  | Axbridge .. ..   | 11·75         | 3·06 | 2  |
|           | 1893  | Butleigh .. ..   | 11·89         | 3·09 | 2  |
|           | 1894  | Mark .. ..       | 12·31         | 3·29 | 2  |
|           | 1895  | Haselbury† .. .. | 12·65         | 3·70 | 2  |
| May . .   | 1892  | Axbridge .. ..   | 12·04         | 3·12 | 2  |
|           | 1893  | Butleigh .. ..   | 12·01         | 3·05 | 2  |
|           | 1894  | Mark .. ..       | 12·51         | 3·35 | 2  |
|           | 1895  | Haselbury† .. .. | 12·58         | 3·39 | 2  |
| June . .  | 1892  | Axbridge .. ..   | 12·20         | 3·17 | 2  |
|           | 1893  | Butleigh* .. ..  | 12·03         | 3·08 | 2  |
|           | 1894  | Mark .. ..       | 12·52         | 3·40 | 2  |
|           | 1895  | Haselbury† .. .. | 12·56         | 3·51 | 2  |
| July . .  | 1892  | Axbridge .. ..   | 12·20         | 3·21 | 2  |
|           | 1893  | Butleigh* .. ..  | 12·14         | 3·20 | 2  |
|           | 1894  | Mark .. ..       | 12·52         | 3·47 | 2  |
|           | 1895  | Haselbury† .. .. | 12·68         | 3·60 | 2  |
| August .  | 1891  | Vallis .. ..     | 12·61         | 3·87 | 2  |
|           | 1892  | Axbridge .. ..   | 12·28         | 3·38 | 2  |
|           | 1893  | Butleigh* .. ..  | 12·14         | 3·19 | 2  |
|           | 1894  | Mark .. ..       | 12·78         | 3·70 | 2  |
|           | 1895  | Haselbury* .. .. | 12·82         | 3·80 | 2  |
| September | 1891  | Vallis .. ..     | 13·00         | 4·13 | 2  |
|           | 1892  | Axbridge .. ..   | 12·56         | 3·57 | 2  |
|           | 1893  | Butleigh* .. ..  | 12·53         | 3·53 | 2  |
|           | 1894  | Mark .. ..       | 13·05         | 3·93 | 2  |
|           | 1895  | Haselbury† .. .. | 13·03         | 3·94 | 2  |
| October . | 1891  | Vallis .. ..     | 13·81         | 4·75 | 2  |
|           | 1892  | Axbridge .. ..   | 13·13         | 4·00 | 2  |
|           | 1893  | Butleigh* .. ..  | 13·49         | 4·30 | 2  |
|           | 1894  | Mark .. ..       | 13·46         | 4·39 | 2  |
|           | 1895  | Haselbury† .. .. | 13·70         | 4·55 | 2  |

\* For first week in month only.

† For first and third weeks in mo

The influence of food upon the composition of a cow's s strikingly illustrated by these figures, for I cannot con now the high proportion of fat in the milk during the mon April can be explained except by the fact that the cows then receiving a liberal allowance of artificial food.

AVERAGE RESULTS OBTAINED DAILY, 1891 TO 1896.

| MONTH.       | VALLIS, 1891. |                          |                   |                        |                                 | AXBRIDGE, 1892. |                          |                   |                        |                                 | BOTTLEIGH, 1893. |                          |                   |                        |                                 |
|--------------|---------------|--------------------------|-------------------|------------------------|---------------------------------|-----------------|--------------------------|-------------------|------------------------|---------------------------------|------------------|--------------------------|-------------------|------------------------|---------------------------------|
|              | Vol. of Milk. | Cheese taken from Press. | Cheese when sold. | Shrinkage in ripening. | Cheese from one gallon of Milk. | Vol. of Milk.   | Cheese taken from Press. | Cheese when sold. | Shrinkage in ripening. | Cheese from one gallon of Milk. | Vol. of Milk.    | Cheese taken from Press. | Cheese when sold. | Shrinkage in ripening. | Cheese from one gallon of Milk. |
| April ..     | 81            | 73                       | 69                | 4                      | .85                             | 79              | 70                       | 66                | 4                      | .83                             | 106              | 96                       | 89                | 7                      | .84                             |
| May ..       | 119           | 117                      | 111               | 6                      | .93                             | 109             | 102                      | 94                | 8                      | .86                             | 149              | 142                      | 132               | 10                     | .88                             |
| June ..      | 132           | 132                      | 123               | 9                      | .93                             | 127             | 122                      | 113               | 9                      | .90                             | 141              | 130                      | 121½              | 8½                     | .85                             |
| July ..      | 112           | 114                      | 107               | 7                      | .96                             | 116             | 115                      | 108               | 9                      | .93                             | 134              | 129                      | 122               | 7                      | .91                             |
| August ..    | 91            | 99                       | 91                | 8                      | 1.00                            | 100             | 102½                     | 94                | 8½                     | .94                             | 134              | 131½                     | 124               | 7½                     | .92                             |
| September .. | 79            | 87½                      | 82                | 5½                     | 1.04                            | 84              | 91                       | 85                | 6                      | 1.01                            | 102½             | 103½                     | 104               | 5½                     | 1.02                            |
| October ..   | 52            | 64                       | 59½               | 4½                     | 1.14                            | 58              | 68                       | 62                | 6                      | 1.07                            | 68               | 80                       | 77                | 3                      | 1.13                            |

| MONTH.       | MARLE, 1894.  |                          |                   |                        |                                 | HASLEBURY, 1895.     |   |               |                          |                   |                        |                                 |                      |   |        |
|--------------|---------------|--------------------------|-------------------|------------------------|---------------------------------|----------------------|---|---------------|--------------------------|-------------------|------------------------|---------------------------------|----------------------|---|--------|
|              | Vol. of Milk. | Cheese taken from Press. | Cheese when sold. | Shrinkage in ripening. | Cheese from one gallon of Milk. | Average No. of Cows. | Average yield of Milk per head per day. | Vol. of Milk. | Cheese taken from Press. | Cheese when sold. | Shrinkage in ripening. | Cheese from one gallon of Milk. | Average No. of Cows. | Average yield of Milk per head per day. |        |
| April ..     | 103           | 101                      | 96                | 5                      | .93                             | 33                   | 3.12                                    | 126           | 126                      | 118               | 8                      | .94                             | 46                   | 2.74                                    | galls. |
| May ..       | 148           | 148                      | 140               | 8                      | .94                             | 50                   | 2.96                                    | 175           | 167                      | 159               | 8                      | .91                             | 61                   | 2.87                                    |        |
| June ..      | 140           | 141                      | 132               | 9                      | .94                             | 51                   | 2.74                                    | 183           | 168                      | 159               | 9                      | .87                             | 70                   | 2.61                                    |        |
| July ..      | 129           | 131                      | 124               | 7                      | .96                             | 52                   | 2.48                                    | 146           | 148                      | 138               | 10                     | .95                             | 70                   | 2.09                                    |        |
| August ..    | 112           | 118                      | 112               | 6                      | 1.00                            | 52                   | 2.15                                    | 139           | 152                      | 138               | 14                     | .99                             | 70                   | 1.99                                    |        |
| September .. | 100           | 112                      | 106               | 6                      | 1.06                            | 53                   | 1.89                                    | 113           | 124                      | 119               | 5                      | 1.05                            | 69                   | 1.64                                    |        |
| October ..   | 74            | 87                       | 81                | 6                      | 1.09                            | 53                   | 1.40                                    | 76            | 90                       | 87                | 3                      | 1.14                            | 65                   | 1.17                                    |        |

\* This is excessive from April to August, partly owing to the heat of the season, partly to the cheese not being sold so soon as in former years.

## (c.) COMPARISON OF RESULTS OBTAINED, 1891-5.

The influence of the composition of the milk upon quantity of cheese made in 1895 is shown in the preceding table, and, for purposes of comparison, the results obtained in former years are also given.

The table also shows that the falling off in the dairy yield of milk was much more rapid at Haselbury than at Mark in 1894. This result might be partly due to the nature of the cows, and partly to the difference in the herbage, but is probably due mainly to the influence of the dry season.

## II.—THE RECORD OF OBSERVATIONS.

As it was necessary to devote a large proportion of time to the bacteriological work, it was not possible to make complete chemical observations and analyses each day, so I instructed my assistant to make these observations daily during the first and third complete weeks in each month. Each day during these weeks sixty observations were made and recorded, as analyses of the milk, whey, and curd. The observations recorded are identically the same as those which were fully reported in 1892 and 1893.

## (a.) STRAINING MILK.

The milk when it is brought into the dairy is poured into a hoop temporarily fixed upon the sides of the tub and covered with a very fine muslin. This, whilst it ensures perfect straining from all large impurities, serves another purpose, in my opinion not less valuable than the mere straining out of these impurities. It is this, that from a careful examination of the residue left in the strainer, some important information is often obtained. Thus, if the cows are not well cleaned before milking the fact is soon shown by the presence of extraneous matter in the strainer. If the cows are suffering from sores it will be known at once by the presence in the strainer of scabs from the sores. Any soreness of the teats will also be shown by the presence of small clots of blood. After a little practice, the cheese-maker will find a few moments devoted to the inspection of the strainer well repaid as indicating whether or not the milking has been carefully and properly done. Far more cheeses are spoiled before the milk comes into the dairy than by careless manipulation in the dairy.

## (b.) SYNOPSIS OF OBSERVATIONS.

In the following table the average results of the most important observations obtained during the two weeks



MONTHLY AVERAGES OF RESULTS OF OBSERVATIONS, DURING 1ST AND 3RD WEEKS.

| Month. | RELATING TO EVENING'S MILK. |   |      |                |   |      |             |   |      |                 |   |      | RELATING TO MORNING'S MILK. |   |      |          |   |      |                 |   |      |          |   |      | RELATING TO CHEESE TAKEN TO CHEESE ROOM. |   |      |                                  |   |      |                               |   |      |                             |   |      |  |   |      |  |   |      |                               |   |      |  |   |      |                             |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |    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-----|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|--------|---|------|
|        | At night.                   |   |      |                |   |      | In morning. |   |      |                 |   |      | Temp. of Milk.              |   |      |          |   |      | MIXED MILK, &c. |   |      |          |   |      | Weighted.                                |   |      |                                  |   |      | Acidity of Liquid from Press. |   |      |                             |   |      | Loss in Press.                                 |   |      |  |   |      | Weight of Cheese when sold.   |   |      |  |   |      |                             |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |
|        | Temp. of Dairy.             |   |      | Temp. of Milk. |   |      | Acidity.    |   |      | Temp. of Dairy. |   |      | Temp. of Milk.              |   |      | Acidity. |   |      | Volume.         |   |      | Acidity. |   |      | Proportion of Rennet added.              |   |      | Acidity of Whey before breaking. |   |      | Acidity of Whey put aside.    |   |      | Acidity of Whey when drawn. |   |      | Acidity of drainings from curd before grating. |   |      | Weight of Curd when curd before grating. |   |      | Acidity of Liquid from Press. |   |      | Weight of Cheese taken to cheese room. |   |      | Weight of Cheese when sold. |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |        |   |      |
|        | galls.                      | ° | min. | galls.         | ° | min. | galls.      | ° | min. | galls.          | ° | min. | galls.                      | ° | min. | galls.   | ° | min. | galls.          | ° | min. | galls.   | ° | min. | galls.                                   | ° | min. | galls.                           | ° | min. | galls.                        | ° | min. | galls.                      | ° | min. | galls.   | ° | min. | galls.                                   | ° | min. | galls.                        | ° | min. | galls.                                 | ° | min. | galls.                      | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. | galls. | ° | min. |

MONTHLY AVERAGES OF RESULTS OF ANALYSES.

| Month.          | COMPOSITION OF MIXED MILK. |         |      |         |          |        |      |         | COMPOSITION OF WHEY. |      |        |         | COMPOSITION OF CURD. |      |        |         |
|-----------------|----------------------------|---------|------|---------|----------|--------|------|---------|----------------------|------|--------|---------|----------------------|------|--------|---------|
|                 | Water.                     | Solids. | Fat. | Casein. | Albumin. | Sugar. | Ash. | Solids. | Fat.                 | Ash. | Water. | Solids. | Fat.                 | Ash. | Water. | Solids. |
| April . . .     | 87.35                      | 12.65   | 3.70 | 2.43    | .41      | 5.37   | .74  | 7.40    | .34                  | .48  | 41.40  | 58.60   | 32.27                | 2.13 | 41.40  | 58.60   |
| May . . .       | 87.42                      | 12.58   | 3.39 | 2.60    | .41      | 5.45   | .73  | 7.21    | .25                  | .44  | 41.14  | 58.86   | 29.78                | 2.15 | 41.14  | 58.86   |
| June . . .      | 87.44                      | 12.56   | 3.51 | 2.58    | .41      | 5.34   | .72  | 7.20    | .31                  | .42  | 40.95  | 59.05   | 29.70                | 2.14 | 40.95  | 59.05   |
| July . . .      | 87.32                      | 12.68   | 3.60 | 2.67    | .40      | 5.29   | .72  | 7.16    | .28                  | .43  | 41.01  | 58.96   | 31.10                | 2.03 | 41.01  | 58.96   |
| August . . .    | 87.18                      | 12.82   | 3.80 | 2.68    | .41      | 5.18   | .75  | 7.13    | .23                  | .43  | 41.14  | 58.85   | 31.17                | 2.13 | 41.14  | 58.85   |
| September . . . | 86.97                      | 13.03   | 3.94 | 2.91    | .42      | 5.00   | .76  | 7.18    | .27                  | .42  | 41.28  | 58.72   | 29.91                | 2.05 | 41.28  | 58.72   |
| October . . .   | 86.30                      | 13.70   | 4.55 | 2.92    | .44      | 5.01   | .77  | 7.21    | .20                  | .43  | 41.05  | 58.95   | 31.05                | 2.12 | 41.05  | 58.95   |

summarised, it not being necessary to reproduce in detail all the observations recorded.

We may now proceed to study systematically the results obtained.

### (c.) DETERMINATIONS OF ACIDITY.

These have been made with the apparatus described in former Reports. I am pleased to hear that its use appears to be increasing, although slowly, among cheese-makers. After five years' experience with it, I am convinced that by its use many of the difficulties which the cheese-maker has to contend against may be materially diminished, if not entirely overcome. Those who have used the apparatus say naturally that they cannot make the great number of determinations which are made in the course of these observations, and they are anxious to know which are the most important. It will be well to answer this question and, at the same time, to draw attention to the most striking points in the results obtained at Haselbury.

The acidity of the milk is the first determination necessary, and this should be made in the evening's milk, not only when it is brought into the dairy, but again in the morning. If the evening's milk has been kept sufficiently warm, the acidity will have slightly risen during the night from say  $\cdot 19$  per cent. to  $\cdot 20$  per cent. If the dairy has been close and its temperature high, the acidity may have risen to  $\cdot 21$  per cent., as shown, for example, in the above table, during the months of August and September. I am inclined to think, however, that the acidity apparatus is not sufficiently delicate to show the extent to which the milk has ripened during the night. Some experiments have been made in which a more dilute solution has been used to determine more precisely the quantity of acid present in the milk in the evening and morning. But the use of a more dilute solution of caustic soda is attended with such difficulties as to make it quite impracticable for the ordinary cheese-maker, and as to its scientific value I am not as yet in a position to speak.

It is not absolutely necessary to take the acidity of the morning's milk, but that of the mixed milk must be taken more carefully before renneting, for it will be the key to the day's proceeding. It is always desirable to begin cheese-making with milk sufficiently ripe, and the best acidity to aim at obtaining is  $\cdot 21$  per cent. The next determination of acidity necessary is in the whey when the curd is thought to be sufficiently firm for the whey to be drawn. The whey should have an acidity of  $\cdot 20$  per cent. before the curd is allowed to settle. Then, as has been shown in the Report for 1892, the acidity will rise as the whey comes from the curd and will reach in the end  $\cdot 22$  per cent.

If now we look at the average results, given in the preceding table, of the acidity of the whey when drawn, it will be found to have been always less than the acidity of the mixed milk. Mention has already been made of the abnormal composition of the milk at Haselbury, and it is in this abnormal composition that we must seek for an explanation of these results. The high percentage of fat in the milk, coupled with the comparatively low percentage of casein, which, when converted into curd, has to retain the fat, necessitated a more careful handling of the curd than would be necessary had the fat been less and the casein more abundant. Consequently at Haselbury it was found necessary to draw off the whey and take the curd from the tub from twenty-two to thirty-six minutes sooner than had been necessary in former years. But the composition of the milk may not be the only reason for these abnormal results, as they may have been partly due to the high proportion of rennet which it was found necessary to employ in order to obtain a firm curd. Moreover, it was undoubtedly due in part to the presence of taints which will be referred to later on.

While it is thus seen that, under certain conditions, it may be necessary to draw off the whey before it has acquired the standard acidity, yet until it is found that such conditions exist, it would be better to adopt the standard of .20 per cent. acidity as the best for the whey to acquire before the curd is allowed to settle prior to drawing off.

The next determination of acidity desirable is that of the drainings from the piled curd on the tub, for it will give some idea of the rapidity with which the cheese should subsequently be handled. If it is found that the acidity from the piled curd is not at least half as much again as that of the whey, then, in all probability, the subsequent development of acidity will be slow, and the necessary precautions should be taken to hasten it so far as possible, more especially by keeping the curd warm. The third determination of acidity will have for its object to determine when the curd is fit to be ground. There is, I must confess, no stage in the manufacture of a cheese more difficult to estimate than this. If the acidity apparatus were used for this determination only it would well repay its cost and the trouble of learning to use it properly. The acidity of the liquid which comes from the press is the final determination made. There will, as a rule, be a close relation between these two estimations, varying mainly according to the weather, or rather the temperature of the curd, which again is due mainly to the temperature of the dairy.

Upon the acidity of the liquid from the press more than

upon any other factor, assuming of course that the cheese kept at an uniform ripening temperature, will depend to a great extent on the acidity of the milk at which the cheese will ripen. If the acidity be low, the ripening process will be slow; if the acidity be high, the ripening process will be rapid; while if the liquid from the press contains over 1·10 per cent. of acidity there will be a tendency for the cheese to be too acid. Here, again, the composition of the milk from which the cheese is made plays an important part in determining the quantity of acid which is permissible in the curd from the press, in other words, in the curd when this is taken to the cheese-room. The richer the milk, the more acid may be present in the curd. This is well shown by the following table, which gives the average amount of fat in the curd and the average amount of acid found in the liquid from the press for the past three years, and also for three months of

COMPARISON OF ACIDITIES AND FAT during the YEARS 1891 and 1895

| Month.      | Year. | Locality.        | Average<br>Percentage of<br>Fat in Milk. | Average<br>Percentage of<br>Acid in Liquid. |
|-------------|-------|------------------|--|---|
| April . . . | 1893  | Butleigh .. ..   | 3·09                                     | 1·10  |
|             | 1894  | Mark .. ..       | 3·29                                     | 1·10  |
|             | 1895  | Haselbury .. ..  | 3·70                                     | 1·10  |
| May . . .   | 1893  | Butleigh .. ..   | 3·05                                     | 1·10  |
|             | 1894  | Mark .. ..       | 3·35                                     | 1·10  |
|             | 1895  | Haselbury .. ..  | 3·39                                     | 1·10  |
| June . . .  | 1893  | Butleigh* .. ..  | 3·08                                     | 1·10  |
|             | 1894  | Mark .. ..       | 3·40                                     | 1·10  |
|             | 1895  | Haselbury† .. .. | 3·51                                     | 1·10  |
| July . . .  | 1893  | Butleigh* .. ..  | 3·20                                     | 1·10  |
|             | 1894  | Mark .. ..       | 3·47                                     | 1·10  |
|             | 1895  | Haselbury† .. .. | 3·60                                     | 1·10  |
| August . .  | 1893  | Butleigh* .. ..  | 3·19                                     | 1·10  |
|             | 1894  | Mark .. ..       | 3·70                                     | 1·10  |
|             | 1895  | Haselbury* .. .. | 3·80                                     | 1·10  |
|             | 1891  | Vallis .. ..     | 3·87                                     | 1·10  |
| September . | 1893  | Butleigh* .. ..  | 3·53                                     | 1·10  |
|             | 1894  | Mark .. ..       | 3·93                                     | 1·10  |
|             | 1895  | Haselbury† .. .. | 3·91                                     | 1·10  |
|             | 1891  | Vallis .. ..     | 4·13                                     | 1·10  |
| October . . | 1893  | Butleigh* .. ..  | 4·30                                     | 1·10  |
|             | 1894  | Mark .. ..       | 4·39                                     | 1·10  |
|             | 1895  | Haselbury‡ .. .. | 4·55                                     | 1·10  |
|             | 1891  | Vallis .. ..     | 4·75                                     | 1·10  |

\* For first week in month only.

† For first and third weeks in month.

‡ For first week only; during third week there was a taint in the milk which prevented proper acidity being developed.

The results at Axbridge in 1892 were exceptional, for reasons previously discussed, and the results at Haselbury were in September slightly low owing to taints.

It thus appears that the percentage of fat present in the milk with which the cheese-maker has to deal affects, or ought to affect, the proportion of rennet to be used, the acidity which may be obtained in the whey before drawing off, and the acidity which may be and should be present in the curd when this is taken to the cheese-room. Such appear to me to be justifiable conclusions to draw from the results of the observations made in 1895 at Haselbury in the light of those previously recorded.

I have heard it stated by old cheese-makers that one of the most essential points in the manufacture of a good cheese is to know how much fat is present in the milk, but I must confess that only recently has the importance of this matter been prominently brought home to me. The old cheese-makers determined the richness of the milk by means of the simple cream taster, and unfortunately there is yet no simple and rapid means of testing the fat in a single sample of milk, for it would be rather troublesome to make a test each day of a single sample by means of the Babcock Tester.

The most simple guide to the richness of the milk in casein is the weight of cheese (curd) made from one gallon of milk, as is well seen by comparing results in the tables on pages 99 and 101.

Such are the chief determinations of acidity required and some of the points which have to be attended to in estimating the value of these acidity determinations. There are many others which have been mentioned in former reports, one of which is the great value of the acidity apparatus when there is a taint present in the milk. Of the more frequently present taints one is characterised by causing a rapid development of acidity, the other by delaying acidity, and at no time will the cheese-maker find greater benefit accrue from the use of the acidity apparatus than when dealing with such tainted milk. Many of the cheeses which are made at the present day from such milk are inferior, owing to the lack of sufficient acidity in the curd when put in the press. This enables the taint to continue its work in the cheese, whereas if more acidity had been developed before the curd was put in the press, the taint would to a large extent pass off during the ripening of the cheese.

#### (d.) LOSS OF FAT IN LIQUID FROM PRESS.

During the month of April there was a considerable amount of fat lost in the liquid from press. Considerable, that is to

say, as compared with the small amount usually lost. The total weight of fat lost was comparatively slight. Thus 9th of May, when the amount of fat present in the liqui press was higher than usual, it was estimated and found to be  $7\frac{1}{2}$  ozs. Half a lb. of fat floating upon the whey is very much more than it actually weighs. But in order to estimate its real importance we must consider how much fat was present in the milk from which that cheese was made. The quantity of milk used was 155 gallons, which would represent about 1,600 lbs. The milk of that particular day was not analysed, but judging from analyses made a few days before and a few days after, the milk would contain 3.4 per cent. of fat. There would, therefore, have been present in the milk  $54\frac{1}{2}$  lbs. of fat in all, of which  $7\frac{1}{2}$  ozs. is only 1.4 per cent. Thus of the total fat present the quantity lost was very small and would have no appreciable effect upon the quality of the cheese. What was of more importance was to discover the cause of this loss, for as it does not always place there must have been some special cause for it during this period. As a rule, the two principal causes of fat coming out in the press are, first, too high a proportion of acid curd, and secondly, *vatting* at too high a temperature. As regards the acidities, these undoubtedly were high, but obviously enough, it was found that the quantity of fat which came out of the cheese had no relation to the acidity of the curd from press. Thus on the 15th of April the acidity of liqui press was 1.09, and fat came out of press as usual; on the 16th the acidity was only 1.03, and "more fat than usual came out." On the 19th, the acidity was 1.24, and "much less fat came out." On turning to the record of temperature, we find that to a certain extent the amount of fat was influenced by this, the higher the temperature at which the cheese was vatted, the greater the amount of fat from the press. Some experiments were made in which the curd was allowed to cool before being vatted. The result was satisfactory. Far less fat then came out. Hence it is evident that where there is a tendency for fat to come out in the press, it is necessary to allow the curd to cool to 70° Fahr. before vatting. It must not, however, be forgotten that by opening up the curd and allowing it to cool after grinding, the acidity will increase considerably. This accounts for the high acidity on the 19th of April previously mentioned.

But neither the acidity nor yet the temperature of the curd were the main causes of this loss of fat, for it had no fixed relation to either, and, without any apparent cause, it suddenly occurred on the 13th of May and did not occur subsequently,

both the acidity of the liquid from the press and the temperature of the curd when in vat were as high, in fact higher, than when the loss of fat occurred. We must, therefore, seek for some other cause. I had reserved samples of this fat for the purpose of investigation, and having noticed that they seemed very liquid, submitted them to a careful investigation at my laboratory in London. The result of this examination was remarkable. The fat had the normal composition of butter fat in every respect but one, namely, its melting point, which was as low as  $54^{\circ}$  Fahr., the solidifying point being  $51^{\circ}$  Fahr. In another instance a sample of this fat showed solidifying point  $66^{\circ}$  Fahr., while the fat in the whey butter from the same milk had a solidifying point of  $79^{\circ}$  Fahr., and the average melting point of butter-fat is about  $89^{\circ}$  Fahr.

Thus it was evident that the fat which was coming from the press was not ordinary butter-fat, but a fat of exceptional properties. The question then arose, does this fat form a regular constituent of butter-fat, or may it possibly be the result of the particular feeding of the cows? At my request the artificial food of the cows was changed, and this was done once or twice, but without any noticeable effect, the fat continuing to come out as before. Hence it did not appear to be due in any way to the food on which the cows were fed.

Its sudden cessation on the 13th of May, after which date it never occurred, and the fact that on the same day the milk rose from 154 to 194 gallons, simultaneously with the introduction of eleven more cows into the herd, caused me to study the effect which these cows had produced upon the milk. I found that during the period preceding this the average composition of the milk was fat 3.66 per cent., casein 2.44 per cent., and that in the week immediately following the introduction of these cows the average composition of the milk fell to 3.33 per cent. fat, while the casein rose to 2.58 per cent. At first sight this does not appear to be a great difference, but the difference is better appreciated by calculating the amount of casein present for each pound of fat. It will then be seen that up to the 13th of May for each pound of fat present in the milk there was only .66 pound of casein present, while, after that date, for each pound of fat there was present .77 pound of casein, which would therefore be far better able to retain the fat in the cheese. I am inclined to think that this affords a better explanation of the facts than the supposition that the milk contained a special form of liquid fat due to the artificial food. It is, however, only right to point out once more that on the 13th of May the artificial food was stopped, so that we have no absolutely conclusive evidence for either the one explanation

or the other. So far as I am aware, the presence of a lic in milk separable under any circumstances is entirely un The matter demands further investigation.

(e.) **RENNET.**

The next subject which requires attention is the propo rennet used in the manufacture of cheese at Haselbu 1892 the quantity of rennet used varied but slightly, one rennet being found sufficient to curdle from 9,031 to 9,423 milk. In 1893 one part of rennet was found sufficient f 8,816 to 9,109 parts of milk, so that a larger quantity of was found necessary. In 1894 a still larger quantity of was used, one part being sufficient only for from 8,024 t parts of milk, except in October of that year, when, fro unaccountable cause, it was suddenly found necessary t the quantity of rennet used. This year again it has bee necessary to employ a much larger quantity of renne heretofore, one part being required for from 6,002 to 7,48 of milk. The great quantity of rennet necessary i surprising that several experiments were made to try if not possible to reduce the amount. The result was Instead of the curd being ready to break in from sev eighty minutes, as it should have been, it required to for nearly two hours. Can any explanation be given phenomenon? I am loth to think that it is due peculiarity of the milk. Yet the only other explanation the rennet was not of the same strength as in forme Unfortunately manufacturers do not guarantee the stre their rennet, so that it is difficult to say whether any has been tampered with or not. But from information received there is good reason to think that much of the sold has been diluted, and is not of the same strength e sent out by the manufacturer. Whether this was the ca the rennet used at the Cheese School, or whether the some other reason as yet undiscovered which made it ne to use so large a quantity, must remain an open question

f.) **THE ULTIMATE DISTRIBUTION OF THE CONSTITUENTS ( MILK.**

In the table on page 98 will be found the averag position of the milk for each month. What beco these constituents during the manufacture of a cheese? the figures for July. The average volume of milk u on which analyses were made amounted to 143



which would weigh 1,473 pounds. This milk contained 12·68 per cent. of solid matter, or an average daily amount of 186·77 pounds of solids. By a simple calculation it will be found that this only 90·21 pounds are recovered in the curd, while 93·08 pounds pass off in the whey, and 3·48 pounds are lost in the liquids from the cooler and press. Hence in the process of cheese-making less than half the total solids of the milk are recovered in the cheese. Perhaps it is not beside the mark to ask whether sufficient attention has yet been given to the other half?

A calculation of the fat present in the milk shows the following results. The July milk contained on an average 53·02 pounds of fat daily. Of this quantity there was present:—

|  |              |
|--|--------------|
| In the curd .. .. .                        | 48·51 pounds |
| In the whey .. .. .                        | 3·61 „       |
| In the liquids from cooler and press .. .. | ·90 „        |
|  | <hr/>        |
|  | 53·02 „      |

The total weight of casein in the milk amounted to about 39 pounds per diem, while the solids in the curd, deducting the fat and mineral matter, amounted to about 40 pounds, showing that the curd contained about one pound of sugar. The remainder of the sugar and the albumin passed into the whey.

#### (g.) COMPOSITION OF THE RIPE CHEESES.

As in former years, when the cheeses were sold, samples were taken and submitted to analysis. The results of these analyses are given in the table on page 110.

### III.—THE EXPERIMENTAL CHEESES.

It is a common belief among cheese-makers that the salting of the curd checks the formation of acidity. This supposition is entirely erroneous, so far as my experience goes. Indeed, so necessary is salt for the growth of bacteria that it is one of the circumstances which must be placed in all artificial nutriment prepared for their culture and study.

However, with the idea that it would be of more practical value to make a distinct experiment upon this point and record the result, the following course was adopted. On the 6th of June the curd was salted and divided into two portions, one being vatted immediately after salting, the other being spread out to dry and left for three-quarters of an hour before vating. The acidity of the drainings before grinding was ·91 per cent. The acidity of the liquid from the press of the portion vatted

## COMPOSITION OF CHEESES WHEN SOLD.

|           |    |         |    |    | Moisture. | Fat.  | Casein, &c. |
|-----------|----|---------|----|----|-----------|-------|-------------|
| April     | 15 | ..      | .. | .. | 35·23     | 34·91 | 26·11       |
| "         | 16 | ..      | .. | .. | 36·38     | 34·69 | 25·19       |
| "         | 20 | ..      | .. | .. | 34·18     | 35·28 | 26·45       |
| "         | 27 | ..      | .. | .. | 35·78     | 34·75 | 25·46       |
| May       | 2  | ..      | .. | .. | 37·62     | 32·06 | 26·48       |
| "         | 17 | ..      | .. | .. | 35·83     | 31·02 | 29·17       |
| "         | 28 | (small) | .. | .. | 36·39     | 29·83 | 30·04       |
| "         | 28 | (large) | .. | .. | 35·52     | 30·07 | 30·56       |
| June      | 7  | ..      | .. | .. | 33·13     | 32·26 | 30·70       |
| "         | 12 | ..      | .. | .. | 31·41     | 30·29 | 34·19       |
| "         | 16 | ..      | .. | .. | 37·57     | 27·27 | 31·35       |
| "         | 20 | ..      | .. | .. | 32·33     | 28·37 | 34·74       |
| "         | 27 | ..      | .. | .. | 33·62     | 29·41 | 32·78       |
| July      | 4  | ..      | .. | .. | 32·99     | 29·23 | 33·89       |
| "         | 5  | ..      | .. | .. | 31·79     | 31·12 | 32·83       |
| "         | 13 | ..      | .. | .. | 32·12     | 32·00 | 31·66       |
| "         | 21 | ..      | .. | .. | 34·82     | 30·15 | 30·91       |
| "         | 27 | ..      | .. | .. | 33·76     | 31·19 | 31·17       |
| August    | 3  | ..      | .. | .. | 33·90     | 33·75 | 27·95       |
| "         | 9  | ..      | .. | .. | 34·80     | 33·00 | 28·30       |
| "         | 15 | ..      | .. | .. | 35·60     | 34·72 | 25·68       |
| September | 5  | ..      | .. | .. | 36·20     | 32·48 | 27·42       |
| "         | 21 | ..      | .. | .. | 35·70     | 31·08 | 29·12       |
| October   | 2  | ..      | .. | .. | 35·50     | 36·45 | 24·05       |
| "         | 5  | ..      | .. | .. | 35·10     | 35·84 | 24·86       |
| "         | 17 | ..      | .. | .. | 36·40     | 32·48 | 26·92       |
| "         | 22 | ..      | .. | .. | 37·00     | 31·85 | 27·05       |

immediately was 1·08 per cent., that of the portion allowed to stand for three-quarters of an hour being cent. The portion vatted immediately was at a temperature 76° Fahr., that vatted after standing three-quarters was 72° Fahr. The acidity of the liquid from the portion first vatted was again taken when the second was vatted, or three-quarters of an hour after it had been pressed. It was then found to be 1·14 per cent. It was seen that the salt did not retard the formation of acid in the open or in the press. The formation of acid was more rapid in the portion exposed to the air than in the portion placed in the press, even though the latter was 4° Fahrenheit temperature.

This experiment proves beyond doubt that salt does not retard the formation of acid in the curd.

shows why, in those methods of cheese-making in which the curd is spread out to cool before being vatted, it is not necessary to produce so much acidity in the earlier stages as may be permitted when the curd is vatted at the moment when sufficient acidity is found to be present.

#### IV.—THE BACTERIOLOGICAL OBSERVATIONS.

As all the other experimental cheeses were made in connection with bacteriological observations and experiments, it is not possible to consider them separately.

##### THE ORGANISMS WHICH PRODUCE SPONGY CURD.

After my Report for 1894 was written, and as the result of a further study of the bacteria found at Mark, I was led to suspect that some of these cultures were very similar to, if not exactly the same as, a well-known organism the *Bacillus Coli Communis*. Mr. J. P. Laws, who was studying the bacteria found in London sewage for the London County Council, supplied me with a pure culture of this organism, which is a constant inhabitant of sewage. One of the first experimental cheeses made in 1895 was with milk into which this organism had been placed the preceding night. It may be as well to state once more the system adopted in these experiments. The night's milk is divided into two portions, one is placed in the ordinary tub, the other in a second tub used for experiments only. Thus, each day that an experimental cheese is made, there is also made, as a check, a cheese from one-half of the milk in the ordinary manner.

The milk inoculated with the *Bacillus Coli Communis* produced a spongy curd, while the curd produced from the other half of the milk was free from sponginess. It is evident then that this bacillus will, if it finds its way into milk, produce a spongy curd.

My next experiment was made with the organism, described in my Report for 1894 as producing a spongy curd, to see whether by being kept growing on artificial food during the winter it had lost its power to produce sponginess. But a spongy curd resulted from the experiment, showing that this power of producing gas and blowing the curd into a sponge is a characteristic peculiarity of this organism which is not destroyed by successive cultivation. After prolonged and careful investigation I have little doubt but that the organism of 1894 is a variety of the *Bacillus Coli Communis*.

Apart from the experimental cheeses above referred to, spongy curd had arisen in the dairy far more frequently than could be desired, and these holey curds were carefully examined, the bacteria they contained isolated and investigated, and experiments made in turn with these organisms also. Thus it was found in due course that there was more than one variety of micro-organism capable of producing sponginess.

I will deal, in the first place, with those organisms which are not all identical but are yet so similar that they may be classed as varieties of the *Bacillus Coli Communis*.

The principal object kept in view during the whole season was to discover, if possible, the source of these microbes, and to trace how they came into the milk. As has already been described, the cows were divided into two lots, one lot being located at Rushey Wood, the other in the fields. In several experiments the milk of each of these lots was kept separate, and from each a cheese was made. The result was that on two occasions the curd obtained from the milk of the field cows was spongy, while that from the milk of Rushey Wood showed no signs of sponginess. The next problem was to discover if and, or what, difference could exist between the two herds. Would there be any difference between the two lots of milk? It seemed possible that the atmosphere of the place where the field cows were milked might not be so pure as that of the milking place at Rushey Wood. The custom of milking the cows always in one part of the field is so universal in Somerset that I fear it will be no use my protesting against it; but a moment's consideration will convince any one who knows the state these milking-places get into that this custom could well be dispensed with. In the heat of summer the droppings of the cows soon dry, and when trampled upon are scattered as dust and contaminate the atmosphere in which the cows are being milked. But as this has been done over and over again when no spongy curd has been obtained, one would not be justified in thinking that this alone was sufficient cause. My assistant, Mr. McCreath, noticed that there were a great many fowls running about this part of the field, and that their droppings were also plentiful, so these were examined bacteriologically and found to contain numbers of the *Bacillus Coli Communis*, and especially of that variety which was present in the spongy curd. Here then appeared to be some clue to the origin of the taint. The cows were moved to another field where they had not been before, and where no fowls were present. Thus the source of contamination with the dust of their own or of fowls' droppings was done away with. To my surprise to find no improvement in the curd, which

continued as spongy as ever. It was now evident that whatever the source of contamination, it was common to the two fields. The apparatus was cleaned, if possible, with more scrupulous care than ever. The milking was done most carefully, and the milker's hands, as also the cow's teats, were washed before milking commenced, yet the trouble continued.

It then occurred to me that the only thing in common between the two fields was the water supply, which was a stream running through both fields. This water was examined bacteriologically on several occasions, and while sometimes the *Bacillus Coli Communis* could be found in the water, at other times it could not. But when the mud on the banks of the stream at or near the places where the cattle would drink was examined, then the organism was always found. By tracing this stream upwards we found close to the fields houses which, so far as could be discovered, were in some instances drained into the stream. Now, as previously stated, sewage is known to be highly contaminated with the *Bacillus Coli Communis*, hence it would be possible for the organism to find its way into the stream from this source, and, as the contamination by the sewage in a small village would be intermittent, this might account for the organism being found in the stream at one time and not at another. The presence of the organism in the mud on the banks where the cows drink is easily accounted for, as such places are invariably contaminated with the cows' droppings, which I have proved to contain the *Bacillus Coli Communis*.

We have then two sources from which the water may be contaminated with one organism which produces spongy curd, first the entrance of sewage into the stream from cottages upon its bank, and secondly, of droppings from the cows, when they get into the stream to drink. The water splashing upon the cows and subsequently drying upon them would, with the movements of milking, become dislodged and fall into the milk, and not even the washing of the teats would completely prevent this contamination.

While my investigations were in progress and quite unknown to me, the British Medical Journal had appointed a special commission to inquire into the quality of the milk sold in some of the poorer districts of the Metropolis. In addition to a chemical examination of the samples, a bacteriological examination was made, which resulted in the Commission reporting that "every sample examined contained specimens of the *Bacillus Coli Communis*, a microbe which has its natural habitat in the intestines; in fact, this particular microbe constituted fully 90 per cent. of all the micro-organisms found in the milk."

It seems evident that, whether from the dirt on the cows or

from their being milked in an impure atmosphere, one of the principal contaminations to which milk is liable is the presence of the bacillus in question. It is often said that cheese making is more difficult now than it was some fifty years ago. Yet, upon investigation, it will be found that better premises exist for dairies, that better apparatus can be procured, and that in nearly every respect the modern cheese-maker is working under conditions which are an improvement on those of his ancestors. Still the difficulties seem greater. May it not be that the true cause of these difficulties is to be found mainly in the contamination of the streams of the country which has taken place during that period, largely owing to the introduction of modern sanitary arrangements by which nearly every stream in the country has been converted into an open sewer? I have made some inquiries to try and discover in what respect districts less liable to spongy curd differ from those where it is prevalent, and, so far as can be judged, it seems less frequent where the streams come direct from the hills with little chance of sewage contamination, and also where the streams have a stony bottom, so that the water runs clear and is not subject to frequent contamination from the dislodged mud of the bank. Moreover, looking back through the records of the Dairy Schools in past years, it is noticeable that spongy curd was not found at Vallis, where the water supply was from a spring, and was brought into troughs from which the cattle could drink. Nor was it prevalent at Axbridge, where the water supply was from dykes cut in the peat or moor land quite away from sources of contamination by sewage. On the other hand it has been prevalent at Butleigh, at Mark, and at Haselbury where in each place the water supply has been more or less liable to contamination with sewage.

It occurred to me that, if my assumption as to the cause of contamination was correct, the use of the milking machine might diminish the trouble. I therefore wrote to some friends in Scotland, and among them to Mr. John Speir, who went to considerable trouble to obtain information for me. But this point does not appear to arise frequently in Scotland, so that the evidence available was not conclusive.

But my inquiries brought me a letter from Mr. Henry McFadzean, the able teacher of cheese-making in Galloway from which I abstract the following paragraphs:—

I have no hesitation in saying that the cause is from the water. It was in a few cases I have known caused by the cows getting to very bad water, and whether or not the drinking of their standing in it, caused it, I am not quite certain, but that one or both caused it, I am quite certain.

"I have also seen holey and spongy curds got from milk that was partly spoiled, by the milk from a cow having a chill or weed in the vessel or udder being put in amongst the rest; this is a great trouble, and occasionally cheeses are spoiled by makers not knowing of, or watching for, such a cause."

Each of my readers must judge for himself how far his experience bears out the preceding assumptions.

Now as to the remedy. We cannot ensure the purity of the streams, though this is a matter with respect to which every dairy farmer who takes an interest in local matters may well bestir himself. In the meantime, however, something else must be done, and it seems to me that the best, the most simple, and the least expensive plan will be, wherever possible, to prevent the cows gaining access to the streams and by supplying them with water in troughs. In selecting a site for these troughs, care should be taken to have them as far as possible from the place where the cows are milked. For, though I have not yet found distinct evidence of the milk being contaminated with the *Bacillus Coli Communis*, floating in the atmosphere from the dried-up droppings of the cows, there is every reason to suppose that such contamination not only might but does arise.

The effect of this organism, which for the sake of distinction will in future be referred to as *Bacillus Coli Communis* No. 1, was not only to make the curd spongy, but to produce that most objectionable fæcal smell, which has been so frequently referred to in former reports. This smell is sometimes present in the curd to a slight extent without there being any noticeable signs of sponginess, and this probably occurs when the organism is present, but not in large numbers.

Further investigation soon proved that there was another organism capable of producing a spongy curd, which, though very similar to the one just described, has certain distinctive peculiarities, so that it may be designated *Bacillus Coli Communis* No. 2.

This organism was found even more frequently than the former. It differs slightly in form and in growth from No. 1, and also appears to have a slightly different action upon the curd, for while, like *Bacillus Coli Communis* No. 1, it forms holes, on the other hand it does not produce the fæcal smell, or only to a slight extent. This organism has been found in the droppings of both cows and fowls.

It is not possible to imagine a farmyard without fowls in abundance, but, in view of the facts above stated, it appears desirable to prevent them coming nearer to the dairy than is inevitable. More especially is it necessary not to put the

cleaned trunks and milking pails out to dry where fowls are running about, as their droppings, especially in hot dry weather, may become dried up and scattered in the dust. This dust would settle upon the milk pails, and the organisms which it contained would find their way into the milk and produce spongy curd.

One characteristic of both these organisms is that, as a rule, they prevent the development of acidity in the curd, so that whenever they are present in the milk the cheese takes much longer to make than it otherwise would. This was strikingly noticeable in the experimental cheeses as compared with the cheeses made on the same days from milk which had not been inoculated. When, therefore, a cheese shows signs of sponginess it is well to take special precautions to ensure obtaining sufficient acidity, and not on any account to hasten the manufacture of the cheese. Those who have the acidity apparatus can easily find out at what rate the acidity is being produced, but without the apparatus it is most difficult to judge. If, however, sufficient acidity be produced in the curd before it is vatted, then, unless the organism is present in large numbers, the cheese improves in the ripening-room. So far as can be judged from experiments made on the ripe cheeses, the organisms would seem to be mostly destroyed during this ripening process. But the cheese is never of the best quality.

The presence of this organism in milk and in cheese need cause no alarm. It is almost universally present, and so far as we know is not injurious. Those who dread the thought of having it in their food have a simple remedy, so far as cheese is concerned, for if they only buy the best quality, they may rest assured that such cheese could not have been made with contaminated milk.

The appearance of the curd when either of these organisms is present is characteristic and well known. It shows numbers of small holes or eyes spread throughout the curd, varying in number according to the amount of the contamination present, but the holes are always small.

Once or twice during the season a far more spongy curd than usual was produced with large holes quite distinct from those resulting from the organisms above referred to. These curds were investigated, the organisms present being isolated and cultivated, and among them was one which, so far as it is possible to judge from memory and my note-books, has not been met with in former years. An experimental cheese was made with milk into which this organism had been placed. The curd was blown into holes much sooner than on any former occasion, and so numerous were the holes, so great the amount of gas formed,



that the curd finally rose and floated upon the whey. A reproduced photograph of this curd will be found facing page 118. This photograph is about one-half the natural size of the piece of curd photographed. In attempting to discover the source of the organism to which this remarkable result was due, I obtained two others which produce similar large holes in the curd during the latter stages of the cheese-making process. One of these three organisms was found in the milk on two occasions only, viz., the 8th and 19th of May. One was found in the mud taken from the bed of the brook from which the cows drink, on the 18th of July. The third was found in cow's dung. A more complete and scientific description of these organisms is given in the Appendix to this Report.

The result of this year's bacteriological work goes therefore to prove that there are, at least, five organisms capable of producing spongy curd; that one of these also produces the fecal taint so often found in curd; and that three have been, and probably all will be, subsequently found in polluted water, more especially in water polluted with sewage from dwelling-houses or from the droppings of the cows. If, as I am inclined to think, no ordinary amount of care on the part of the milkers can prevent such organisms getting into the milk, when once they have become lodged on the bodies of the cows, it is evident that where the cows have of necessity to drink contaminated water, the only preventative against these taints in curd is to have the water supplied in troughs, and stop, so far as possible, the animals from getting into the streams.

#### SUMMARY.

In the commencement of this Report, I pointed out that not a single excellent cheese was made during the season, though apparently the most favourable conditions existed for making the cheese.

I have endeavoured to explain in the preceding pages how this result could not be attributed to want of skill on the part of the teacher, to want of cleanliness in the dairy, nor even to the composition of the milk. What then was the cause? Undoubtedly that the milk, before it reached the dairy, became contaminated with micro-organisms detrimental to the manufacture of an excellent cheese.

An attempt has been made to point out some of the probable sources of these organisms, more especially the likelihood of their coming either from impure air where the cows were milked, or impure water which the cows might stand in.

The remedy for these evils is evident, but not its adoption. It is more particularly necessary to keep the out of polluted streams and to supply them with watertroughs.

I desire to state that Miss Cannon and others most co-operated in carrying out the numerous experiments were made in the dairy, although every experiment double the amount of work which would have to be through in the ordinary course of cheese-making. help from the teacher is essential, for, had it not been rendered and a keen interest taken in the experiments could not have been made so frequently, nor so satisfactorily as they have been.

The object of the experiments being to discover the causes, a certain quantity of inferior cheese was necessarily produced. However, I hope in the future to turn my attention to the bacteria which produce the highest quality cheese, and, if those investigations prove successful, they will more than compensate for any loss which may have entailed in the past.

I have been ably assisted by Mr. James McCreath, who carried out his duties with care, devoting his time solely to the work entailed by the observations and experiments.

## APPENDIX.

### BACILLUS COLI COMMUNIS. No. 1.

This organism is a short bacillus of varying length, averaging 1.5 micron,\* and the breadth .6 to .7 micron. The ends are slightly pointed, giving the organism an egg-shaped appearance. Long rods are occasionally formed.

**Source.**—Sewage, curd (frequently), and fowls' dung.

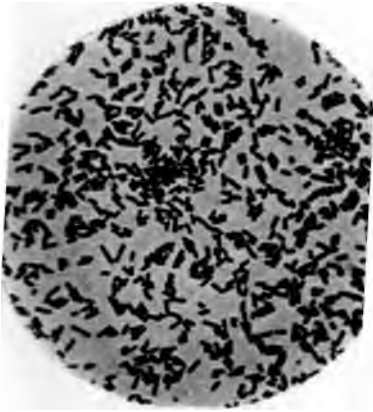
**Growth.**—*Plate Culture on Gelatine.*—The surface colonies are flat, spreading, having very irregular borders. Held up to the light they are light blue in colour. No liquefaction ensues.

*Streak Culture on Gelatine.*—Slightly raised growth along the line of inoculation, while the growth spreads rapidly on either side, forming a very thin dull-white film, with a smooth and shiny surface and very irregular edge.

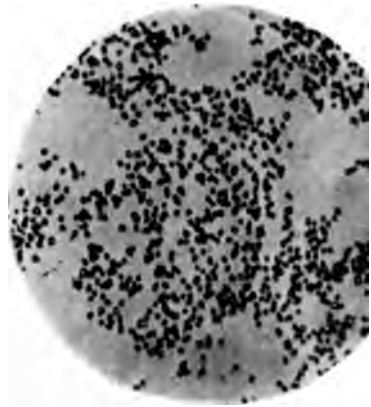
*Stab Culture in Gelatine.*—Large gas bubbles are formed. Liquefaction takes place in the stab, and a white film spreads over the surface of the gelatine.

\*A micron is the 1000th part of a millimeter, or about the same part of an inch as a breadth is usually written  $\mu$ .

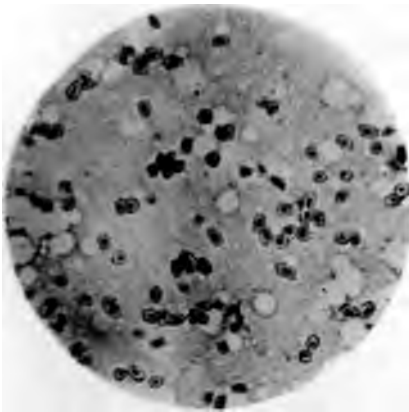
## SPONGY CURD BACTERIA.



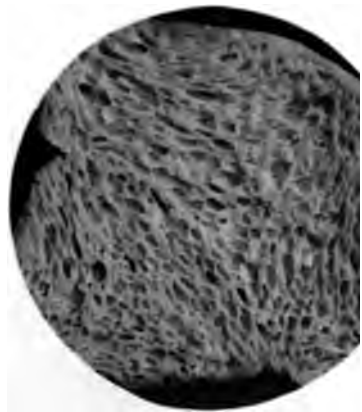
No. 3  $\times 750$



No. 4 on Agar  $\times 750$ .



No. 4 in Milk  $\times 750$ .



Curd produced by No. 4.



*Streak Culture on Agar.*—Growth along line of inoculation slightly raised, with thick spreading film on either side, edges straight.

*In Beef Broth.*—The organisms are deposited, the liquid remaining clear.

*In Milk.*—At a temperature of 70° Fahr. the organism multiplies rapidly, growing singly, and not assuming the long rod form. The milk is not curdled.

**Stains.**—Stains readily in fuchsine.

**Spore Formation.**—Doubtful.

**Motility.**—Very slowly motile.

**Remarks.**—The size of the organism appears to vary greatly, according to the age of the culture and the nature of the medium on which it is grown. Thus on agar the organisms are longer than when grown on gelatine. Milk inoculated with this organism produces a spongy curd having very small holes, and with a strong faecal smell. The development of acidity is retarded.

#### BACILLUS COLI COMMUNIS. No. 2.

This organism is a short bacillus of varying length, on an average 1·2  $\mu$  long, and .7  $\mu$  broad, the ends being distinctly rounded, many appearing almost circular, and when grown on agar are shorter and stouter than when grown on gelatine, with a length of about 1  $\mu$ , and breadth of .8–.9  $\mu$ . The organisms occasionally grow together to form rods about 3–4 micra in length.

**Source.**—Whey cream, curd, fowls' droppings.

**Growth.**—*Plate Culture on Gelatine.*—A white, slimy, circular colony, very raised in centre, and spreading round the sides. The gelatine does not liquefy.

*Streak Culture on Gelatine.*—The bacillus grows rapidly, forming a broad white thicker growth than No. 1, and having a characteristic rough corrugated surface. The edges of the growth are very uneven, and have a smoother and less corrugated appearance than the interior.

*Stab Culture in Gelatine.*—Abundant production of gas.

*Streak Culture on Agar.*—A thick raised white streak with smooth and shining surface, with slight unevenness about the edges.

*In Beef Broth.*—The organisms grow as a deposit in the broth, the broth remaining clear.

*In Milk.*—The organism when grown at a temperature of 70° Fahr. does not curdle the milk, and grows singly or in pairs, longer forms not being produced.

**Stains.**—Stains with difficulty.

**Spore Formation.**—Probable.

**Motility.**—Very slowly motile.

**Remarks.**—This organism is shorter when grown on agar than when grown on gelatine, which, together with its characteristic growth on gelatine, distinguishes it from *Bacillus Coli Communis* No. 1. Milk inoculated with the organism produces a spongy curd very similar to that produced by *Bacillus Coli Communis* No. 1, but the faecal smell is scarcely noticeable. Acidity is retarded.

## SPONGY CURD BACILLUS. No. 3.

This organism is a long rod bacillus of  $2.5\ \mu$  in average length, and  $.8\ \mu$  broad. The smallest rods are about  $1.5\ \mu$  long, and the organisms join into rods as long as 5 micra. The rods have distinctly rounded ends.

**Source.**—Cow dung, and curd.

**Growth.**—*Plate Culture on Gelatine.*—Colonies minute and circular, with regular edge and very much raised, having a slightly yellow tinge by reflected light, and opaque under microscope by transmitted light.

*Streak Culture on Gelatine.*—The growth is spreading, edge irregular, and slightly raised. It is slightly corrugated down the middle, but the sides are smooth and flat. Growth in some respects similar to each variety of *Bacillus Coli Communis*.

*Stab Culture in Gelatine.*—Large gas bubbles are formed.

*Streak Culture on Agar.*—Growth, along line of inoculation, slightly raised, and spreading on either side to form a very thin flat film with shiny and smooth surface, having slightly raised irregular or indented edges.

*In Beef Broth.*—Growth mainly sinks to the bottom, the broth remaining slightly cloudy.

*In Milk.*—The bacilli are slightly shorter and inclined to grow in pairs. No curdling of the milk ensues.

**Stains.**—Stains readily in fuchsin solution.

**Spore Formation.**—Appears marked.

**Motility.**—None.

**Remarks.**—The organism is in many respects similar to *Bacillus Coli Communis* and may be a third variety. Curd made from milk inoculated with this organism contains very large holes, quite different to those produced by the *Bacillus Coli Communis*, and does not possess the characteristic faecal smell. The development of acidity is not retarded.

SPONGY CURD BACILLUS. No. 4. *Qy. BACILLUS GUILLEBEAU (a).*

A small, nearly square bacillus, which, being very minute, was at first thought to be a coccus.

**Source.**—Curd.

**Growth.**—*Plate Culture on Gelatine.*—The colonies are much raised, with smooth and shiny surfaces, dirty white in colour, and of slimy consistency. The gelatine is not liquefied.

*Streak Culture on Gelatine.*—The growth is rapid, and presents a thick, moist, and shiny appearance, is dirty white in colour, and of such slimy consistency that in a short time the whole growth slides down to the bottom of the tube. The organism when grown on gelatine appears to have a capsule.

*Streak Culture on Agar.*—A white spreading growth, slightly raised, having a smooth, flat, and shiny surface, and rather irregular wrinkled edge. The growth does not slide down as in the gelatine culture.

*In Beef Broth.*—Sediment formed.

*In Milk.*—At 70° Fahr. the milk thickens into a pasty-like mass at the end of seven days.

**Stains.**—Stains readily in fuchsine. Methyl blue shows the capsuled appearance best.

**Spore Formation.**—Not observed.

**Remarks.**—When grown on agar there is no sign of a capsule, but on gelatine and in milk a capsule appears to be formed.

Milk inoculated with this organism makes a remarkably spongy curd, with such large holes that the curd floats. Smell nauseous. Acidity develops rapidly while curd in the whey, but afterwards proceeds very slowly.

#### SPONGY CURD BACILLUS. No. 5.

A very minute bacillus, with rounded ends, about  $\cdot 7 \mu$  long and  $\cdot 4 \mu$  wide.

**Source.**—In mud, at the edge of the stream from which cows drank.

**Growth.**—*Plate Culture on Gelatine.*—An irregular-shaped surface colony, white and spreading.

*Streak Culture on Gelatine.*—A thick, slimy, dirty-white growth, which gradually slides to the bottom of the tube, but does not liquefy the gelatine.

*Streak Culture on Agar.*—Very similar to that on gelatine, but is more inclined to spread, and does not slide off the surface.

*In Beef Broth.*—A sediment produced, the broth remaining clear.

*In Milk.*—Does not curdle nor digest the milk.

**Stains.**—Stains with some difficulty.

**Spore Formation.**—Not observed.

**Motility.**—Not observed.

**Remarks.**—Milk inoculated with this organism produces a spongy curd, but the holes formed are not large, nor yet numerous.

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#### XI. — *The Farriery School conducted by the Society for the Somerset County Council.* By THOS. F. FLOWMAN, Secretary and Editor.

##### SHOEING COMPETITIONS.

For many years past Horse-shoeing Competitions have formed part of the proceedings at the Society's Annual Meeting, and have been exceedingly popular, both with the many smiths who have taken part in them as also with the general public. Whilst they have fostered a spirit of emulation in the smiths, they

have helped to spread a knowledge of the correct principles of shoeing, by affording practical illustrations of what constitutes good workmanship.

#### A MIGRATORY SCHOOL.

The appreciative interest shown in the competitions by farriers and their apprentices induced the belief that if, by means of supplementary instruction in the most approved methods of shoeing, further help were forthcoming, it would be welcomed by those for whom it was intended. Hence a communication was addressed to the Society by the Technical Education Committee of the Somerset County Council, inquiring if it would be prepared to organise and conduct, on behalf and at the cost of the County Council, a Migratory School of Farriery on conditions generally analogous to those in force for the Butter Schools conducted by the Society. The Society's Council, having accepted the responsibility, referred the carrying out of the necessary arrangements to its Agricultural Education Committee, who subsequently started a School upon lines akin to those successfully adopted by the County Council of Berks for a similar School.

In making the preliminary arrangements, the Committee were much indebted for advice and assistance to Mr. A. Wheatley, F.R.C.V.S., the honorary veterinary adviser to the Berkshire County Council, and organiser of its School.

#### MODE OF INSTRUCTION.

The School is supervised by the Society's Farriery Steward (Colonel Best), and the Veterinary Surgeon attached to it is Mr. G. H. Elder, M.R.C.V.S., of Taunton. The latter lectures to the classes upon the anatomy of the horse's foot, and upon other subjects connected with farriery, and acts as general adviser upon the work of the School.

The practical instructor is Mr. W. B. Blackall, master smith, late of Coleshill, Highworth, Wilts, who, previous to his appointment to the post, had won sixteen prizes and several high commendations at shoeing competitions held by the Bath and West and Southern Counties Society and other Societies.

The instruction is restricted to those who are already in the trade. This is essential, not only to avoid jealousy and ill-will, but because the instruction can only be given effectively, in the necessarily limited number of lessons, to those who have already acquired a fair knowledge of ordinary shoeing. The aim is to improve old hands rather than to attempt to teach mere beginners.



A course of instruction, the fee for which is 2s. 6d., consists of ten lessons. These are given at six o'clock in the evening, as the pupils, having their ordinary work in the daytime, cannot conveniently attend before that hour. A class consists of four pupils, and, as the same pupils cannot always attend night after night, it is generally arranged to have two different classes, which are taken on alternate nights.

The pupils are shown the correct method of shoeing every kind of horse they are likely to have to deal with, and how to adapt shoes to abnormal conditions of feet.

A typical collection of shoes and hoofs is always on exhibition at the School, and the explanations given of them are much appreciated.

Forges, iron, and all the necessary tools and appliances are provided by the Society, and are contained in a van, which is moved about from place to place, so that the School may be within easy reach of the smiths of any particular locality in the county.

#### OPENING OF SCHOOL.

The School opened first at Taunton on April 8th, 1895, and from that date until May 25th as many pupils as could be received attended regularly. The Society's Annual Exhibition being held at Taunton last year, the operations of the School were suspended at the time, and the van and its contents were exhibited in the Showyard, where they excited much interest. At the termination of the Show on June 3rd, the School re-opened at Taunton, and so many smiths in that town and neighbourhood desired to take advantage of the instruction that sufficient pupils were forthcoming to keep the School fully employed there until August 4th.

#### PRIZE COMPETITIONS FOR PUPILS.

At the conclusion of a certain number of courses in a district, a competition for prizes and certificates is held, open exclusively to pupils from the classes, and, in order to encourage regularity of attendance, only those who have attended at least eight lessons are entitled to compete.

The Registration Committee of the Farriers' Company admit the winners of the First Prizes in these competitions to the Official Register *free of charge*, on their satisfying the judges that they have a fair knowledge of the structure of the horse's foot, while all the other competitors who satisfy the judges of their competency are admitted on payment of the usual fees (*viz.*, 1*l.* for masters, and 5*s.* for journeymen).

On August 5th, prize competitions were held at Taunton, of the thirty-two pupils who had each attended a course of instruction, twenty-four took part in them. Judges and examiners were Messrs. A. Wheatley, F.R.C. and G. H. Elder, M.R.C.V.S. The competitions result as follows:—

#### FOR NAG HORSE SHOEING.

- 1st prize (1*l.* 10*s.*), C. Cook, West Monkton.
- 2nd prize (10*s.*), F. Weaver, Paul Street, Taunton.
- 3rd prize (5*s.*), T. Aish, 5, Cann Street, Taunton.

In this competition three competitors were highly commended, and one was commended.

#### FOR CART HORSE SHOEING BY SENIORS.

- 1st prize (1*l.* 10*s.*), F. Morrish, Norton Fitzwarren.
- 2nd prize (10*s.*), A. Curry, 4, Eastbourne Gate, Taunton.
- 3rd prize (5*s.*), J. Churchill, Curry Mallet.

#### FOR CART HORSE SHOEING BY JUNIORS.

- 1st prize (1*l.*), S. Badcock, 9, Wood Street, Taunton.
- 2nd prize (12*s.* 6*d.*), R. J. Sully, West Monkton.
- 3rd prize (7*s.* 6*d.*), F. Ash, Shoreditch, Taunton.

In the junior competition one competitor was commended. The prizes were contributed by the County Council, Mayor of Taunton, and others.

At the conclusion of the competitions, the Mayor (Mr. W. Fowler) presided at a dinner which he kindly gave to all competitors, and at which the results of the competitions were formally announced.

#### PLACES VISITED AND ATTENDANCE OF PUPILS.

As will be seen from the following table, the School, during the nine months it has been in existence, has visited six centres and given instruction to seventy-one smiths. This number sufficiently indicates that those for whom it was intended have taken advantage of it, whilst those who have promoted it are fully satisfied of its utility, and that it is thoroughly fulfilling the object for which it was instituted. It has not only succeeded in point of attendance, but the pupils have shown genuine and intelligent interest in their work, and have hesitated to express themselves as thoroughly satisfied with the instruction given.

**PLACES VISITED AND ATTENDANCE OF PUPILS TO DECEMBER 31st, 1895.**

| Centre.              | Year. | School  |          | No. of Courses held. | No. of Students. |
|----------------------|-------|---------|----------|----------------------|------------------|
|                      |       | Opened. | Closed.  |                      |                  |
| Taunton .. .. .      | 1895  | April 8 | Aug. 5   | 8                    | 32               |
| Wellington .. .. .   | "     | Aug. 7  | " 31     | 2                    | 7                |
| Milverton .. .. .    | "     | Sept. 2 | Sept. 14 | 1                    | 3                |
| Wiveliscombe .. .. . | "     | " 16    | Oct. 25  | 2                    | 12               |
| Williton .. .. .     | "     | Oct. 28 | Dec. 6   | 2                    | 12               |
| Dunster .. .. .      | "     | Dec. 9  | " 20     | 1                    | 5                |
|                      |       |         |          | 16                   | 71               |

**COST OF SCHOOL.**

The total capital expenditure upon the School was as follows :—

|                                      |         |
|--------------------------------------|---------|
| Purchase of van and fittings .. .. . | £ s. d. |
| 72 11 3                              |         |
| " " tricycle for instructor .. .. .  | 7 0 0   |
| Total .. .. .                        | 79 11 3 |

The expenses of the School for the nine months named were as follows :—

|   |          |
|---|----------|
| Wages and Instructor's travelling expenses .. .. .    | £ s. d.  |
| 93 14 0   |          |
| Coal, iron, &c. .. .. .                               | 13 16 7  |
| Carriage and cartage .. .. .                          | 7 1 3    |
| Rent of yards .. .. .                                 | 8 10 6   |
| Prizes and Judges' expenses * at competition .. .. .  | 7 2 0    |
| Steward and Secretary's travelling expenses .. .. .   | 3 19 0   |
| Printing, stationery, postage, and office .. .. .     | 22 9 2   |
|   | 156 12 6 |
| Less received from pupils for fees .. .. .            | 8 17 6   |
| Net cost of School, from April 1st to Dec. 31st, 1895 | 147 15 0 |

It should be stated that at present no payment has been made for the services of the Veterinary Surgeon, and this will have to be added when the accounts for the year are finally made up.

XII.—*Cider-Making in France.* By the Society's Representatives (R. NEVILLE GRENVILLE, F. G. FARWELL, F. J. LLOYD, F.I.C., and THOS. F. PLOWMAN).

#### VISIT TO BRITTANY.

THE Pomological Society of France held its Annual Exhibition and Conference for 1895 in Brittany, making St. Brieuc, which is situated in a large cider-making district, its headquarters. The Council of the Bath and West and Southern Counties Society, thinking it desirable to be represented on the occasion, with a view of ascertaining in what respects the methods adopted abroad with regard to the cultivation of cider-fruit and the manufacture of cider differ from those pursued in our own country, communicated with the French Society. In reply, they received an assurance that their representatives would receive a cordial welcome, and we were accordingly deputed by the Council to attend the meeting in question, which was held on October 17, 18, 19, and 20.

#### OBJECTS, &c., OF THE SOCIETY.

The Pomological Society of France has, for its main object, the promotion of everything tending to assist and improve the cultivation of apples and pears and the manufacture and sale of the beverages obtained therefrom. It has a large number of members, among whom landowners, farmers, nurserymen, manufacturers and labourers, are all well represented. It holds an Annual Exhibition and a Conference, which take place each year in a different district. Prizes, consisting of works of art, medals and diplomas, are then offered for trees, fruit, beverages, machinery and appliances, and also for nurseries located in the district in which this exhibition is held. Beyond this, the Society, by conducting practical and scientific research, and by publishing the results of its investigations, does much to stimulate the industry it represents.

#### FRUIT EXHIBITS.

The exhibits of fruit were staged in the buildings of the gymnasium of the Municipal Schools of St. Brieuc. These classes were divided into four sections, viz.:—1. For farmers and cultivators, whose exhibits were grown by themselves on the land they occupy; 2. For landlords, who exhibited fruit grown on their property; 3. For associations, who exhibited collections of fruit gathered in the particular districts they represented; and 4. For heads of educational institutions, who exhibited fruit

gathered in the parish or parishes to which their schools belonged. There was also an "honour section," open to winners of first prizes at previous exhibitions of the Society.

Each exhibit consisted of ten varieties of cider apples or pears, and there were ten specimens of each variety. All exhibits were shown on white plates of a uniform size, and if the exhibitor did not possess these plates, they were lent to him at a nominal cost by the Society. No less than 3,150 plates of fruit, each plate containing ten specimens, were exhibited.

Some of the apples measured as much as from 13 to 14 $\frac{3}{4}$  inches in circumference, and were stated to weigh over 18 ozs.; but these were not found to be the best for cider-making.

Noticeable among the exhibits was a fine collection of apples grown in the Province of Quebec from trees originally exported from France. This collection had been exhibited at Montreal on September 24th, and had then been forwarded to St. Brieuc, in order to show what the French Canadians could produce. It was thought by many that the apples grown in Quebec were superior to those from the original stocks.

To illustrate the thorough manner in which the people are educated to realise the importance of detail concerning the fruit which they grow, every exhibitor has to fill up a printed card for each variety exhibited, particularising the characteristics of the tree at various stages of growth, and of the fruit, the nature of the soil, situation, &c. The following is a translation of one of these cards:—

|                              |               |
|------------------------------|---------------|
| Exhibitor's No.....          | Fruit No..... |
| Name of Fruit.....           |               |
| Density of the juice in..... | 189 .         |

*Information.*

|                         |   |
|-------------------------|---|
| Blossoms.....           | Appearance or<br>shape of the<br>tree } ..... |
| Ripens .....            |   |
| Bearing qualities ..... |   |
| Hardihood .....         |   |
| Vigour .....            | Soil .....                                    |
|                         | Aspect .....                                  |

*Analysis.*

|  |               |
|--|---------------|
| Average weight.....                    | Sugar.....    |
| Volume of juice per kilogramme } ..... |               |
| = 2·204 lbs. avoird. ....              |               |
| Density .....                          |               |
|  | Acidity.....  |
|  | Tannin.....   |
|  | Mucilage..... |

*Observations.*

.....

.....

.....

The particulars given on these cards are copied from forms filled up by the exhibitors.

As the cards are not sufficiently large to permit of much writing thereon, certain conventional signs have been adopted and are used instead. The following is a translation of these signs:—

| <i>Blossoms.</i>   |                               | <i>Conventional Signs.</i> |   | <i>Bearing, Hardi-<br/>hood, Vigour.</i> |                   |
|--------------------|-------------------------------|----------------------------|---|--|-------------------|
| <i>Sign</i>        | <i>Indicating</i>             | <i>Sign</i>                | <i>Indicating</i>                               | <i>Sign</i>                              | <i>Indicating</i> |
| 1st—April          |                               | 1st Season                 | { September to com-<br>mencement of<br>October. | 10                                       | Perfect.          |
|                    |                               |                            |   | 9  | Very good.        |
| 2nd { Commencement | of May to mid-<br>dle of May. | 2nd "                      | { October,<br>November.                         | 8  |                   |
|                    |                               |                            |   | 7  | Good.             |
|                    |                               |                            |   | 6  |                   |
|                    |                               |                            |   | 5  | Passable.         |
| 3rd { End of May,  | commencement<br>of June.      | 3rd "                      | { December,<br>January.                         | 4  | Mediocre.         |
|                    |                               |                            |   | 3  |                   |
|                    |                               |                            |   | 2  | Bad.              |
|                    |                               |                            |   | 1  |                   |

The card is subsequently placed on the plate on which the fruit is exhibited, so that visitors are enabled not only to see the fruit but to learn what is known concerning its growth and characteristics. Thus the Exhibition is made essentially educational. The advantage of these details was clearly demonstrated to us for we noticed several country people taking apples from the pockets and comparing them with the various fruits exhibited until they could identify the sort, and then making notes of the names and qualities for future use and reference. The exhibitors sometimes supplemented the information given on the card by drawings of the trees, and plans of the orchards, specifying the exact trees from which the samples exhibited had been taken.

The exhibits of apples were judged in the following way:—

1. From 1 to 25 points were awarded for the information given on the cards.

2. From 1 to 25 points for the appearance of the exhibit.

3. From 1 to 50 points for the density of the juice. This was ascertained at the Show, the apples being ground and pressed for the purpose.

Mr. Lloyd was appointed one of the jury to take the density of the juice obtained from the exhibits. For the first twenty exhibits the weight of the apples themselves and also that of the pomace was recorded, as well as the density of the juice. The weight of the ten apples varied from 1,212 grammes (2 lb 10 ozs.) down to only 515 grammes (1 lb. 2 ozs.), while the weight of the pomace was found to vary considerably, as a rule being about half the weight of the apples; in some cases :  
... though in others slightly less, than half. Forty-si

exhibits of apples, grown by farmers, forty-seven of those shown by schoolmasters, and fifteen of those shown by landed proprietors, were thus tested. The density of the juice of the various exhibits ranged from 1·0550 to 1·0795.

#### EXHIBITS OF CIDER, &c.

The liquids, which were exhibited in the same buildings as the fruit, consisted of cider and perry in bottles and in casks, and also of *Eau-de-Vie* manufactured from cider. Some specimens of liqueur were also shown which had been made from cider-spirit, but these were not for competition, being merely examples of the use to which cider-spirit was capable of being turned. No exhibitor was allowed to show any liquid which was not the product of his own fruit or manufacture. It was a condition that the samples of cider and perry in casks should consist of at least thirty litres (six gallons), and those in bottles of at least five litres (one gallon). In judging the cider a maximum of ten points was given for taste, and of ten for clarification, while all the samples which could not obtain at least five points for flavour, the same number for clarification, and which did not yield five degrees of alcohol or its equivalent in sugar, were disqualified. If sugar or any other foreign substance had been added to the cider or perry by the exhibitor, this had to be stated on the entry-form. Some of the exhibits, illustrating the results of experiments on filtration, inoculation, &c., were intended merely for educational purposes, and were not entered for competition.

Opportunities were given for those who were known to be really interested in the production of cider to taste the exhibits, and a free and lively discussion was continually taking place as to their relative merits.

#### IMPLEMENT EXHIBITS.

The exhibition of implements and appliances was held in a fenced-off portion of the Champ de Mars, a large open space, used for drilling purposes, in front of the barracks, St. Brienc being a garrison town. The smaller exhibits were under shedding, the larger ones being shown in the open. As the weather was beautifully fine there was no disadvantage in the latter arrangement, but, had it been wet, it would have been attended with much inconvenience. The implements for which prizes were offered comprised: 1, Crushers and Grinders; 2, Presses; 3, Distillers; 4, Pulverisers; 5, Pumps; 6, Filters; and 7, Any other apparatus connected with the cultivation of cider-fruit and with the manufacture of beverages therefrom.

We will allude to one or two appliances that came under our notice, but we felt that to ascertain the real value of any of the apparatus shown, a carefully conducted trial was essential. Such trials were being made by the various juries appointed, but the details and results of these trials will be announced later on in the official report of the Society.

We were particularly struck by the absence of any mills similar to those generally used in England. The mills for grinding the fruit were mainly crushers, rather than mills or grinders such as are best known among us. A new mill was exhibited in which the crushing apparatus was a couple of corrugated bevelled discs, each carried by a separate spindle placed at a slight angle, so that at one position the radius of one disc was parallel to the radius of the other disc, and separated by only about  $\frac{1}{4}$  inch. As the wheels moved round, the apples were caught in the distended portion of the discs and gradually drawn through the portion where they ran parallel, being thus completely crushed. The pips remained whole.

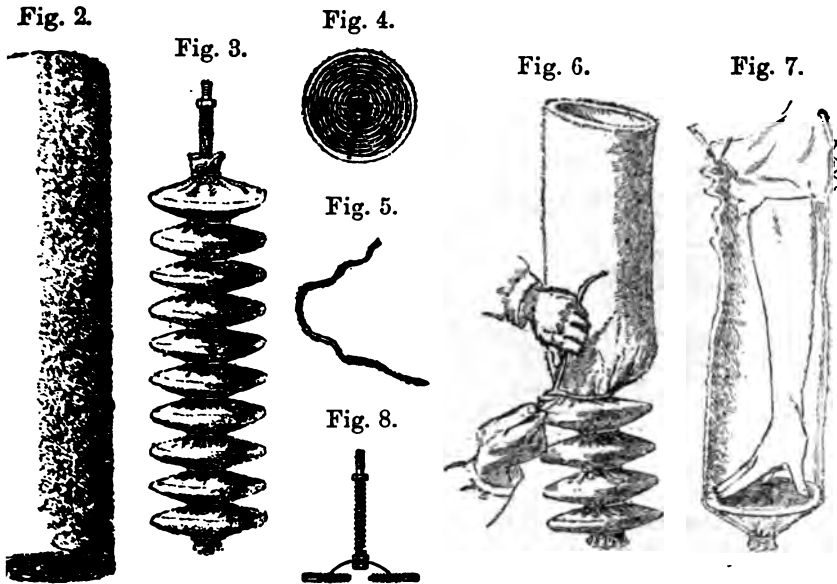
The presses were nearly all of the Continental pattern, similar to the one used in the Bath and West Society's experiments at Butleigh last year, and depicted in the Society's Annual 'Journal.' A new form of combined press and grinder, entirely of iron, in which the action is continuous, was also exhibited. It is somewhat similar to the Bessemer press, invented many years ago for the treatment of sugar cane. The pulp is fed into a cylinder in which works a powerful piston. After exerting its pressure on the pulp the piston recedes; the cylinder is again fed with pulp, which in turn receives the pressure of the piston. From the further end of the cylinder the exhausted pulp comes away under great pressure, while from the lower portion of the cylinder, which is composed of an open grate of iron, the extracted juice passes into a separate receptacle. The inventor and manufacturer is Mons. Texier Jeune, of Vitré, Ille-et-Vilaine, France, who has kindly supplied us with the accompanying illustration (Fig. 1) of the appliance:—

Fig. 1.





The Société du Filtre Maignen, of 5, Avenue de l'Opéra, Paris, and 255, Regent Street, London, whose water filter is well known in England, exhibited an asbestos filter for cider, which appeared efficient, and is cheap. The asbestos cloth, made up into a sac (Fig. 2), is arranged in the form of a concertina (Fig. 3), by means of discs inside (Fig. 4), and cords (Figs. 5 and 6) outside. One end is tightly closed (Fig. 7), the other end is terminated by a metallic nozzle with union (Fig. 8).



This filter is intended to be used as soon as the juice comes from the press. To strain by simple gravitation is not only slow but practically impossible. It is very difficult to pass any sweet liquid through a filter, and this is especially so in the case of apple-juice when mucilage and earthy and other matters so quickly form an almost impenetrable covering. Mons. Maignen claims to have overcome this difficulty by placing the filter in the tub which receives the juice. Then, by means of the union attached to the pipe of a pump, the juice is forcibly drawn by suction through the asbestos cloth from the *outside to the inside*, passing through into the cask clear and bright (Fig. 9). All the sugar or fruity qualities remain in the clear liquid, nothing but the pomace, &c., being removed.

Conspicuous among the exhibits of apparatus were examples of various stills of all sizes for distilling the alcohol from cider for the manufacture of *Eau-de-Vie*. We were informed that large quantities of this spirit are thus produced, but more especially from fruit which does not yield cider fit for drinking purposes, and also in seasons, such as the last, when there are more than sufficient apples for the production of the cider likely to be required. In such cases the apple-juice is fermented to "dryness" as rapidly as possible, little trouble being taken to rack or clarify it, or in any way to retard the first and tumultuous fermentation, as would be necessary were the cider intended to retain some of its sugar, or to go through the slow secondary fermentation upon which the bouquet of cider partly depends.

Fig. 9.



Some of these stills are very ingenious. The cold cider as it is poured into the upper portion of the apparatus condenses the vapour coming from the lower chamber or boiler, and so becoming warmed in its passage enters the boiler hot. By means of a syphon tube the liquid in the boiler is kept at a uniform level, the exhausted cider running away from the boiler automatically. Thus the distillation is continuous, no water is required for condensing purposes, and the cost of distillation is solely that of providing the necessary heat, which is obtained from a paraffin lamp. Any farmer is at liberty to use a still, no duty being imposed on its use as in England; but should he wish to dispose of the *Eau-de-Vie* so made, he has to pay duty when placing it on the home market, but not when exporting it. About ten gallons of cider containing 6 per cent. of alcohol are required to produce one gallon of *Eau-de-Vie* of the strength known in England as "proof."

Among the minor articles exhibited we noticed a patent syphon of which we are enabled, through the courtesy of M. P. Noel, of 30, Rue de Texel, Paris, the patentee,

to give the following illustrations, Figs. 10 and 11. The patentee claims that by the use of this bung not only is all foul air prevented from entering any cask when on draught, but that it is also of practical value in testing, watching, and checking the fermentation of wines, cider, and other liquors in course of manufacture. By its use the liquid is prevented from coming into direct contact with the air, and thereby absorbing germs which may prove not only detrimental to the liquid, but cause what is well known in cider as tumultuous fermentation.

Fig. 10.

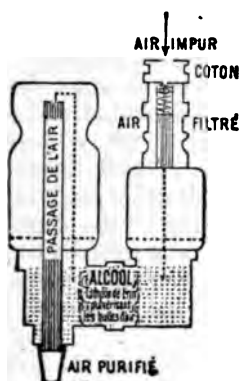
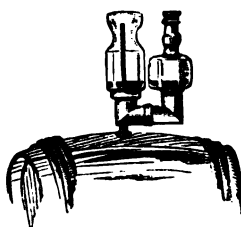


Fig. 11.



Among other exhibits were various pumps and similar apparatus for spraying fruit trees. One of these was very ingenious, being made of the bamboo cane, up the centre of which the spraying liquid was forced. These canes being light and very long, it was possible for a man walking round the tree to play the spray upon any part, or by passing it up between the branches to get at the interior, and so apply the spray to any diseased portions of the bark or foliage.

#### FRUIT TREE EXHIBITS.

Prizes were given for collections of, at least, six apple or pear trees grown for cider or perry respectively, and for six seedlings raised from the same. Prizes were also offered for the best nurseries in the surrounding district of St. Brieuc.

#### THE CONFERENCES.

At 8.30 each evening a Conference was held at the Hôtel de Ville, at which several hundred people were present. Papers were read and animated discussions took place with reference

to the cultivation of cider-fruit, the manufacture of cider, and the legislation affecting it. These meetings were thoroughly practical in their character, and afforded admirable mediums for the interchange of opinions upon points closely affecting the interests of the industry under consideration. They were attended by landed proprietors, farmers, manufacturers, and heads of educational institutions, and the keenest interest was shown in all the proceedings. If a subject were broached upon which there was evidently great divergence of opinion, instead of continuing a heated debate the matter was at once referred to a Committee, appointed by the meeting, to consider and report thereon. When possible, the Committee met early next day and presented their Report at the Conference in the evening. One of the most important questions discussed was raised by the Mayor of St. Brieuc, viz. :—What percentage of alcohol should genuine cider contain ?—with a view of putting down, if possible, a custom, which was thought to prevail, of manufacturers buying genuine cider from the farmers, and diluting and otherwise tampering with it before re-selling. Owing to the difference of opinion which was expressed the subject was referred to a Committee, who reported that cider should contain at least 4 per cent. of alcohol, and this conclusion was accepted by the Conference.

The awards of the juries for each section of the exhibition were announced, and the prizes and certificates were presented, at a meeting of the Conference held in the afternoon of the last day of the exhibition. The final meeting took place the same evening, when a vocal and instrumental concert with recitations formed part of the proceedings.

During the Conference complimentary references were made to the experimental work, in connection with cider-making, carried on by the Bath and West Society at Butleigh, and, on the motion of the Chemist of the Pomological Society (Mons. E. Morio), a silver-gilt medal was awarded by the Society to Mr. Neville Grenville, for having instigated and promoted these researches, and a similar medal to Mr. Lloyd, in recognition of the work he had accomplished. Mons. Morio gave particulars of Mr. Lloyd's Observations, as recorded in the Bath and West Society's 'Journal,' and said that they had thrown a new light upon many points connected with the manufacture of cider.

Leaflets giving a few practical hints of special importance with reference to fruit-growing and cider-making were distributed by the Pomological Society to those attending the conferences. We append the following translation of a portion of one of these leaflets, as the points embodied in it are well worth bearing in mind by cider-makers :—

## THE MANUFACTURE OF CIDER.

Cleanliness very materially affects the quality of the cider.

1. The first condition requisite in order to obtain good cider is to choose apples of good quality.

2. The fruit should be picked on a fine day, just before it is quite ripe.

It should be placed in heaps protected from the rain, as the latter damages it.

3. The fruit must not be crushed in the grinder until it is quite ripe, and no rotten fruit must be passed through the grinder.

Let the pulp stand at least half a day before putting it in the press.

4. The casks containing the cider cannot be too clean, and they should be free from any taint or smell.

5. In order that fermentation may proceed under advantageous conditions, the temperature of the cellar must be kept at about 15° Centigrade (equal to 59° Fahrenheit). The fermentation can be watched by means of a hydrometer. An immediate racking is necessary when it proceeds too quickly.

6. The cider must be drawn off after the first fermentation into perfectly clean casks, which should be kept constantly full in order to prevent the cider from turning sour.

7. Spoilt fruit and that which has fallen before it is ripe must not be mixed with the other fruit; it can be made into cider either for home or immediate use.

8. "Bitter sweet" apples are the best for cider. Cider of superior quality is made by mixing sweet and "bitter sweet" apples together; the best qualities of the two will combine, while the defects of each will be neutralised.

9. Sour apples used alone or in considerable quantities produce a cider of bad quality.

## LES FRÈRES DE L'INSTRUCTION CHRÉTIENNE.

Endeavours are made, and successfully, to interest the heads of educational institutions in the meetings of the Pomological Society, and among the school instructors who take a special interest in them are those known as "Les Frères de l'Instruction Chrétienne." Their schools, which appear to be conducted somewhat on the same lines as our National Schools on the voluntary system, make agriculture one of their five primary subjects of education. As was pointedly stated by Le Frère Abél, who is an active Member of the Council of Management of these schools, and also a Vice-President of the Pomological Society, "we teach our scholars first to be Christians, and secondly how to earn their livelihood."

Through the courtesy of Le Frère Abél, we have been presented with copies of the agricultural primer used in these schools. In the preface to this, reference is made to the fact that the population of the country is practically drifting towards the towns, and it is pertinently asked, "Is it not the duty of every man concerned in the well-being of his country to educate the young to fight against these false ideas, and to establish in the minds of the children a love of the country and of rural

pursuits?" It is further observed that, "in order to give children country tastes and encourage them to understand and love agriculture, we teach them at school such subjects as may interest them in and attach them to the land."

The primer deals with the soil, plants, trees, live stock, implements, and work of the farm. Such operations as are connected with dairying, cider-making, &c., are explained, and there are particulars of the birds and insects injurious to the crops. The descriptions are given in simple language, which can be easily understood by the young, and are accompanied by many illustrations, which materially add to the attractiveness of the book. Some of the leaflets distributed by the Pomological Society at its meetings consisted of extracts from this primer, and the leaflet, of which we have given a translation, was derived from this source.

It is a pity that in our own rural elementary schools some similar course of instruction is not adopted. We teach the children by pictures what a lion or a whale may be like, in case they should meet either of them on their way home from school; but we do not teach them the difference between turnip-seeds and charlock, how to graft or prune, or any of the hundred-and-one different subjects which would make agricultural life more attractive to them, and help to retain them on the land.

#### ORCHARDS AND MANUFACTORIES.

Opportunities were given us (of which we were glad to take advantage) to visit some of the principal orchards and nurseries in the district. The orchards of Brittany are very different from those of England, being mostly on arable land instead of on grass. The arable land is deeply cultivated, and carries a rotation of crops, special attention being given to the manuring of the land. One of the manures recommended for apple trees is a mixture of nitrate of soda, sulphate of iron, and basic slag. The trees in the orchards are planted in rows, running north and south, at considerable distance apart, and they are most carefully kept, it being quite an exception to see an ill-kept or decaying tree.

Most of the farmers know the names of the apples which they grow, and, thanks to the influence and teaching of the Pomological Society, are becoming acquainted with the conditions which affect the growth and composition of the fruit. This information they obtain partly from specialists and partly from the schools of each district, and we were particularly struck by the great interest shown in the work of the Society by all

the scholastic, ecclesiastic, and landed interests of the neighbourhood.

Near St. Briec we inspected a manufactory of cider attached to a large college, dedicated to St. Charles. Here we were met by several of the officials of the college, who very courteously explained the method of manufacture adopted and described the machinery used. As the drink of the scholars, who number some hundreds, is mainly cider, a considerable quantity is made annually for their consumption.

In the manufactory referred to, the apples are thrown into a box of definite capacity which is then raised, automatically tilted, and the apples turned into the shoot leading to the crushers. The pulp is fed by hand into two large presses of the Continental shape. In one of these the pressure is applied from above, as in the English press. The other, like all the Continental presses, has an iron screw passing up the centre on which the pressing gear screws downwards.

We noticed, in these Continental presses, three improvements upon those used in our experiments last year, viz.:—(1) the interior of the outer cage was lined with coarse cloth; (2) the interior iron screw was surrounded by a wooden grating through which the juice could pass; and (3) the pulp was divided and separated into layers by means of gratings.

The juice as it came from the press was pumped into oblong keeves in which the first fermentation was allowed to take place, the head being removed by a perforated skimmer. The partly clarified juice next passed into very large circular tanks lined with granite of a special variety not acted upon by cider. One of these was open for our inspection. It measured 10 feet across and was over 12 feet high. The bottom was perfectly level and purposely so. The top was domed. This tank we calculated to be capable of holding about 6,000 gallons of cider. A very ingenious arrangement had been made for removing the lees from the bottom of the tank, so as to retard fermentation. After this the tank is closed with a metal hood resting in a ring of metal containing water, so that the gases evolved during fermentation may escape while the cider remains unexposed to the atmosphere. The joints between the blocks of granite are smeared over with grease to prevent the cider acting upon the cement as it otherwise would. We heard that it is frequently the custom to smear the insides of barrels with grease, also to cover the cider when in bulk, as in this instance, with a very thin layer of oil, above which carbonic acid gas, artificially prepared, is introduced.

## FRENCH COURTESY.

It is not possible to close this Report without some reference to the very hearty welcome which, as the Society's representatives, we received from our French *confrères*, and from all with whom we were brought into contact. The utmost cordiality was shown to us, and all possible facilities were forthcoming to enable us to see and learn everything relating to the object of our visit. To this end, we were appointed honorary members of the adjudicating body, and were presented with badges similar to those worn by the Council of the Pomological Society, so that we might enjoy corresponding privileges of access to the various departments of the Exhibition and Conference. There was no attempt made to conceal anything, and we had only to express a desire to visit an orchard or a manufactory to find that arrangements were made for us to do so, and that a willing conductor was at our disposal.

We were also most hospitably entertained by the President of the Society and others connected with it, and these and similar opportunities facilitated an interchange of thoughts and experiences which was very helpful.

## RECOMMENDATIONS.

Our visit to St. Brieuc has induced us to make the following recommendations with reference to the exhibition of cider at the Society's Annual Shows:—

1. That, instead of money, medals and certificates of merit be given as prizes.
2. That the exhibits be divided into the four following sections, viz. :— Cider made (a) in Devon; (b) in Herefordshire; (c) in Somerset; (d) in other counties.
3. That each section be divided into three sub-sections for cider made by (a) Landowners; (b) Tenant farmers; (c) Cider merchants.
4. That each sub-section be divided into two classes for (a) Cider in cask; (b) Cider in bottles.
5. That no cider be considered genuine which does not contain at least 4 per cent. of alcohol.
6. That all exhibitors sign a declaration that the cider is made solely from apple-juice and contains no preservative.
7. That all exhibits be delivered in the Show-yard at least ten days before the opening of the Show, so as to allow of analysis.
8. That all exhibits be considered the property of the Society, and that facilities may be given for public tasting.



9. That the Society provide cards to be filled up by each exhibitor, giving particulars concerning the fruit from which the cider is made and other information.

10. That the Judges be instructed in making their awards to consider (1) flavour and aroma; (2) clearness; (3) alcoholic strength.

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XIII.—*Investigations into the Manufacture of Cider. Report for 1895.* By F. J. LLOYD, F.C.S., F.I.C.

As the work on Cider-making proceeds it becomes more and more evident that the ultimate product depends mainly upon two great factors, first, the original composition and condition of the apples, and secondly, the fermentation which takes place in the juice. It may be said that this is self-evident. True, but like all self-evident general principles their successful utilisation in practice depends upon a number of details, and it is into these details we must now enter.

What then are the many causes which influence the composition of the apples and the juice obtained from them? Before we can satisfactorily answer this question we must have some means of estimating analytically the composition of the juice, and to obtain this has been my first consideration. The following system has been adopted:—

ANALYSIS OF APPLE-JUICE.

Six or more apples (approximately 1 lb.) are taken for examination, ground in a small machine (which had to be devised for the purpose), and the pulp thus obtained is placed in a small press, such as is used for pharmaceutical purposes, and the juice extracted.

The analysis of this juice is made as follows:—

The *specific gravity* is determined with a hydrometer.

The *solids* are estimated by evaporating 5 cubic centimeters to dryness on a water bath and drying the residue at 100° C. (212° Fahr.) for a definite time, viz., ten hours. I find by experiment that it is not possible to obtain the solids absolutely dry, for if continuously dried they lose weight constantly for several days. It was therefore thought better to carry out a uniform system rather than attempt to obtain an absolute result.

The *acidity* is determined by means of a standard solution of alkali, each cubic centimeter of which is equivalent to

·0067 grammes of malic acid. The indicator used is 1 paper, for the colour of the apple-juice prevents any change a liquid indicator being seen.

The *Sugar*.—There are present in apple-juice at least varieties of sugar. In order to estimate the total amount of sugar it is all converted into one variety by heating with dilute hydrochloric acid for thirty minutes. The total amount including that which is thus “inverted,” is estimated by the method of Pavy’s modification of Fehling’s Solution.

The *Tannin*.—This is by far the most difficult substance to estimate, and at present the methods at our disposal for the purpose are not very satisfactory. However, it was necessary to adopt some one method, and, after many experiments, the most available method appeared to be that of Neubauer. A solution of permanganate of potash containing 0·785 grammes of permanganate per litre is taken. Tannin has the power of discoloring this solution. To determine the exact point of complete discoloration a solution of indigo is added to the juice as an indicator. For example, 5 cubic centimeters of apple-juice are taken for examination, to these are added 5 cubic centimeters of indigo solution of such a strength that the 5 cubic centimeters will discolour exactly 1 cubic centimeter of permanganate solution. Next 5 cubic centimeters of dilute (1 in 10) sulphuric acid are added, and the whole made up with distilled water to 200 cubic centimeters. To this solution the standard solution of permanganate is carefully added until the colour of the solution disappears. The quantity of permanganate required, less 1 cubic centimeter, gives the amount which has been discoloured by the tannin. In these determinations it is assumed that the tannin has the composition  $C_{14}H_{10}O$  so that 1 cubic centimeter of the permanganate solution is discoloured by 0·001 gramme of tannin. The strength of the permanganate solution must be checked by experiment with pure tannin.

I have given this process in full. The other methods of analysis adopted are well known. Should others be adopted upon the same subject, it is most desirable that the results obtained should be comparable. One advantage which they possess in France over us in England, is that chemists meet together to decide upon a system of analysis to be adopted for the examination of such substances as apple-juice, cider, &c., so that the results obtained by various workers may be compared, even if not absolutely correct. Then when new methods of analysis are discovered there is another meeting of chemists to decide if any new method is found to be better than the old one.

adopted for all future work, and by degrees the old determinations are corrected.

Having fixed upon a system of analysis, the composition of the juice of different varieties of apple was next determined.

Mr. Farwell (the Society's Steward of Cider) and others kindly obtained specimens of cider-fruit from various counties, and forwarded them to Butleigh, where they were analysed by my assistant, Mr. Wm. D. McCreath.

In this way eighty varieties have been examined, and the results are tabulated in the Appendix. It is hoped that these analyses may form the nucleus of a systematic examination of the cider-fruit of the West of England. To make the results more valuable, I would suggest, first, that numbered tree labels should be supplied by the Society. Secondly, that members who forward specimens for analysis should be supplied with such analysis free of cost, upon undertaking to permanently attach to the tree from which the apples are gathered the label supplied to them. Upon receipt of the apples this label, bearing a number corresponding to the number of the analysis, would be forwarded by me to the sender. It is desirable, for several reasons, that the trees should be numbered: first, in order that specimens may be obtained from the same trees in consecutive years; and secondly, that graftings may be taken from those trees which are found to produce apples of good quality for cider-making. The analyses ought to help materially in promoting the supply of good fruit trees; for, as the great variation in value between different varieties of apple becomes more generally recognised, greater care will, it is hoped, be taken in the planting of cider-fruit trees.

From a careful study of these analyses, it is very evident that much has yet to be done to improve the cider-fruit of this country. From at least one-half of the apples it would be quite hopeless to expect to make first-class cider. If we compare these results with those from apples used for cider-making on the Continent, we shall better appreciate how little has yet been done in England to improve cider-fruit.

In a little work on Agriculture, written for scholars in elementary schools by Les Frères de l'Instruction Chrétienne, the following ten varieties of apples are stated to be among the best grown in France for cider-making. Appended to each is the analysis of the juice as given in a pamphlet published by the Syndicat Pomologique de France, showing the analyses of these varieties from specimens which were exhibited at the Shows of that Society during the years 1892-94.

## PERCENTAGE COMPOSITION OF JUICE.

| Name of Fruit.        | Average Weight of an Apple. | Juice extracted from 1000 lbs. of Apples. | Density of the Juice. | Sugar in Juice. | Acidity, expressed as Sulphuric Acid. | Tannin.   | Mucilage. |
|-----------------------|-----------------------------|---|-----------------------|-----------------|---------------------------------------|-----------|-----------|
|                       | oz.                         | lbs.                                      |                       | per cent.       | per cent.                             | per cent. | per cent. |
| 1st Season—           |                             |   |                       |                 |                                       |           |           |
| Blanc Mollet .. ..    | 1·38                        | 740·0                                     | 1·0740                | 13·85           | ·155                                  | ·210      | ·40       |
| Doux Joseph .. ..     | 1·42                        | 492·1                                     | 1·0916                | 18·15           | ·156                                  | ·528      | ·57       |
| Saint-Laurent .. ..   | 1·12                        | 696·0                                     | 1·0750                | 15·26           | ·150                                  | ·255      | ·33       |
| 2nd Season—           |                             |   |                       |                 |                                       |           |           |
| Bramtot .. ..         | 1·85                        | 664·8                                     | 1·0888                | 20·35           | ·194                                  | ·335      | ·15       |
| Launette Grosse .. .. | 1·76                        | ..  | 1·0820                | 18·10           | ·350                                  | ·480      | ..        |
| Marechal .. ..        | 1·95                        | 748·0                                     | 1·0780                | 15·25           | ·160                                  | ·510      | ·45       |
| Médaille d'Or .. ..   | 1·15                        | ..  | 1·0942                | 19·64           | ·188                                  | 1·120     | ·45       |
| 3rd Season—           |                             |   |                       |                 |                                       |           |           |
| Frequin-Audievre ..   | 1·28                        | 769·0                                     | 1·0740                | 16·05           | ·125                                  | ·215      | ·14       |
| Grise-Dieppoix .. ..  | 1·16                        | 499·1                                     | 1·1164                | 21·10           | ·155                                  | ·790      | ·27       |
| Reine des Pommes ..   | 2·80                        | 560·5                                     | 1·0700                | 16·25           | ·260                                  | ·418      | ·29       |

In the Report for 1894 the influence of season on the quality of the apple-juice was pointed out, and a similar effect was noticeable in 1895, though unfortunately it was not possible to obtain specimens of all the varieties then analysed.

The following table gives the temperature, rainfall, and sun-

## TEMPERATURE, RAINFALL, AND SUNSHINE IN 1895.

| Names of Stations. | Air Temperature.        |                          | Rainfall.            |                          | Bright Sunshine.       |                          |                                  |                          |
|--------------------|-------------------------|--------------------------|----------------------|--------------------------|------------------------|--------------------------|----------------------------------|--------------------------|
|                    | Min. and Max. Combined. | Difference from Average. | Total fall in Month. | Difference from Average. | No. of Hours recorded. | Difference from Average. | Percentage of possible Duration. | Difference from Average. |
| April ..           | 49·5*                   | +3·1*                    | 1·99                 | — ·19                    | 125·8                  | — 19·6                   | 31                               | — 4                      |
| May ..             | 55·2                    | +3·55                    | ·65                  | —1·48                    | 261·6                  | + 68·7                   | 55                               | +15                      |
| June ..            | 59·35                   | +1·35                    | 1·28                 | — ·96                    | 226·7                  | + 33·0                   | 46                               | + 6                      |
| July ..            | 60·45                   | — ·2                     | 2·59                 | — ·08                    | 173·2                  | — 3·9                    | 35                               | — 1                      |
| August ..          | 60·05                   | — ·05                    | 2·67                 | + ·08                    | 173·6                  | — 10·2                   | 39                               | — 2                      |
| September ..       | 60·15                   | +4·55                    | 1·20                 | +1·91                    | 211·0                  | + 77·1                   | 56                               | +20                      |
| October ..         | 45·5                    | —3·4                     | 3·07                 | — ·26                    | 86·6                   | — 6·0                    | 27                               | — 3                      |

The values marked (\*), and the whole of the Bright Sunshine record, were obtained at Cullompton only.

shine in 1895, and by comparing these figures with those published in last year's 'Journal,' it will be seen that 1895 was a better year than 1894, but not so good as 1893, as regards conditions favourable to the apple crop.

As is well known, the season was a plentiful one, and the apples were of fair quality, better than in 1894, but not so good as in 1893.

This is seen by the following table, which gives the results of the analyses of the same kinds of apples for the three years of observation:—

COMPOSITION OF APPLE-JUICE.

| Variety.           | 1893.   |         |       | 1894.   |         |       | 1895.   |         |       |
|--------------------|---------|---------|-------|---------|---------|-------|---------|---------|-------|
|                    | Sp. Gr. | Solids. | Acid. | Sp. Gr. | Solids. | Acid. | Sp. Gr. | Solids. | Acid. |
| Red Jersey .. ..   | 1·0680  | 16·5    | ·20   | 1·0470  | 10·72   | ·19   | 1·0660  | 16·14   | ·16   |
| Kingston Black ..  | 1·0680  | 16·5    | ·32   | 1·0500  | 11·34   | ·44   | 1·0672  | 16·60   | ·64   |
| Gins .. ..         | 1·0750  | 18·1    | ·39   | 1·0526  | 12·06   | ·23   | 1·0635  | 15·94   | ·17   |
| Horners .. ..      | 1·0650  | 16·0    | ·62   | 1·0450  | 10·38   | ·23   | 1·0554  | 13·58   | ·31   |
| Average .. ..      | 1·0690  | 16·8    | ·38   | 1·0486  | 11·12   | ·27   | 1·0630  | 15·56   | ·32   |
| New Cadbury .. ..  | 1·0574  | 14·0    | ·16   | 1·0415  | 9·14    | ·16   | ..      | ..      | ..    |
| Tom Hooper .. ..   | 1·0632  | 15·4    | ·72   | 1·0520  | 11·38   | ·70   | ..      | ..      | ..    |
| Royal Somerset ..  | 1·0550  | 13·5    | ·60   | 1·0435  | 9·48    | ·71   | ..      | ..      | ..    |
| Bethels .. ..      | 1·0570  | 14·0    | ·20   | ..      | ..      | ..    | ..      | ..      | ..    |
| Court of Wick ..   | 1·0530  | 13·0    | ·65   | ..      | ..      | ..    | 1·0675  | 15·88   | ·88   |
| Blenheim Orange .. | 1·0610  | 15·0    | ·60   | ..      | ..      | ..    | 1·0575  | 13·74   | ·58   |
| Red Streaks .. ..  | ..      | ..      | ..    | 1·0566  | 12·90   | ·74   | ..      | ..      | ..    |
| Average of all     | 1·0622  | 15·2    | ·44   | 1·0485  | 10·92   | ·42   | ..      | ..      | ..    |

The following table shows the average composition of the juice from the press for the three years during which the observations have been in progress, and these figures prove even more strikingly than those of the preceding table, that, in 1895, the quality of the apple-juice in bulk fell, considerably below that of 1893:—

AVERAGE COMPOSITION OF JUICE FROM PRESS.

|            | No. of Samples. | Solids. | Acid. |
|------------|-----------------|---------|-------|
| 1893 .. .. | 6               | 14·40   | ·63   |
| 1894 .. .. | 11              | 11·14   | ·60   |
| 1895 .. .. | 13              | 12·24   | ·46   |

There is still another factor which appears to influence the composition of the apple-juice, and that is locality. Into this subject we have not as yet attempted to enter fully, but the following results are interesting:—

COMPOSITION OF JUICE FROM KINGSTON BLACKS.

| Grown at            | Sp. Gr. | Acid. | Sugar. | Tannin. | Solids. |
|---------------------|---------|-------|--------|---------|---------|
| Butleigh .. .. .    | 1·0672  | ·64   | 14·08  | ·216    | 16·60   |
| E. Lambrook .. .. . | 1·0695  | ·41   | 15·62  | ·302    | 17·08   |

*Gathering the Apples.*—While we must strive in the future to obtain better fruit for the manufacture of cider, in the meantime it is necessary that we should utilise to the best advantage that which we already possess. The first question which arises is, when ought the fruit to be picked? At present much of the cider-fruit of this country is left upon the trees until it drops, and is then collected into heaps on the ground, and exposed to the sun, air, and rain.

An apple which has dropped upon the soil, in the first place, is bruised; secondly, it collects dirt; and thirdly, it soon begins to decay. The evil effect of allowing the apple to collect dirt is so self-evident that it needs no comment. Whether the apples, by being bruised and decaying, are any the worse for cider-making, is a point upon which there seems much difference of opinion.

When the apple in this state is left exposed to the rain, there can be no doubt whatever that much of its nutriment is washed out, and the sugar being thus lost the resulting juice is impoverished.

Moreover, it is only necessary to carefully examine a number of apples in a field “store” or heap, to see that any mould which is growing is always found on the bruised and decaying part. This mould will subsequently find its way into the juice, where its spores will act as ferments detrimental to the cider, and will invariably give it a characteristic mouldy flavour.

In such bruised apples the decay is not always of one kind, two varieties, “brown” and “black” rot, being easily recognisable. The latter is, I believe, universally regarded as bad; opinions differ, however, with respect to the “brown” rot.

An experiment was therefore made to determine the effect of allowing the apples to get rotten. The apples being hand-picked were kept in a clean and dry place, until a sufficient number had gathered to permit of analyses being made of both sound and

rotten specimens. From the results obtained, it is evident that two distinct changes take place, first the tannin is precipitated in large part by allowing the apple to rot, and so does not enter the juice. This is shown by the following analyses. The rottenness was that known as "brown" rot:—

COMPOSITION OF JUICE FROM SOUND AND ROTTEN APPLES.

| —      |    |    |    |    | Sp. Gr. | Acid. | Sugar. | Tannin. | Solids. |
|--------|----|----|----|----|---------|-------|--------|---------|---------|
| Sound  | .. | .. | .. | .. | 1·055   | ·23   | 12·50  | ·54     | 13·70   |
| Rotten | .. | .. | .. | .. | 1·055   | ·18   | 12·19  | ·168    | 13·42   |

It will be seen that the acidity slightly diminishes and that there is a loss of sugar. The juice of the rotten apples was of far darker colour than that of the sound apples, and upon keeping it in clear glass bottles, so that the changes taking place might be observed, it was found that the juice from the rotten apples cleared far more rapidly, as fermentation progressed, than that from the sound apples.

Secondly, the apples lose considerably in weight by rotting, and their juice contains far more matter in suspension than that from sound apples, which may in part account for its clearing more rapidly. Further experiments, however, are needed.

Whether the apples should be allowed to get rotten *in a dry store* or not must remain for the present an open question, and one for future inquiry, but there is clearly no doubt that the effects produced by allowing them to fall and rot on the ground are detrimental to the manufacture of good cider, especially if the apples be exposed to the rain. I am convinced that cider apples ought to be picked before they have become quite ripe. Immediately the apples from a tree begin to drop it is time for all the fruit upon that tree to be gathered. The apple appears to attain a maximum size before it is ripe. When once it has attained that size nothing is gained by leaving it upon the tree. If left it merely ripens and certain chemical changes take place within it by which the sugar increases, &c. These changes, however, take place to the same extent if the apple is taken off the tree, and the connection between the apple and the tree does not, so far as I am able to judge at present, in any way affect the ripening process.\*

If the apples have been picked before they are ripe they must be stored away to ripen. Some experiments were made

\* L. Lindet, who has made a study of the ripening of cider-apples, comes to a similar conclusion.—'Compte Rendus,' 1893.

this season with apples so picked and kept in hurdle stores, as described in the 'Journal' for 1893. The result was most satisfactory. The apples were cleaner, riper, and less rotten than those obtained in any other way. Being in stores, and under cover, they can be left until opportunity arises for making them into cider. But where there is no provision for storing apples the cider-making has to be carried out at a breakneck speed to keep pace with the fall of the apples. If they are gathered up into heaps and left on the ground the rain washes out some of the sugar, especially from those which are bruised and rotten, while the dirt which is taken up with them when they are removed to the cider house is alone sufficient to prohibit the manufacture of a good drink.

It is essential that the apples when in the hurdle stores should be well covered, so as to prevent the rain washing or penetrating into the store. Owing to the considerable amount of rain which fell at Butleigh during the months of November and December 1895, this was not always ensured, and the result is well shown in the following analyses:—

COMPOSITION OF JUICE FROM WHITE JERSEYS.

| —                                    | Acid. | Sugar. | Total Solids. |
|--------------------------------------|-------|--------|---------------|
| 7th Nov.—Picked from tree .. ..      | ·16   | 11·49  | 12·62         |
| 20th Nov.—Placed in Hurdle Store ..  | ·22   | 11·90  | 12·76         |
| 16th Dec.—Taken from Hurdle Store .. | ·26   | 11·33  | 12·26         |

Evidently from these figures it is better, if possible, to store the apples on a dry floor in a loft, provided they are not packed too thickly and are moved regularly to prevent heating. One advantage of this system is that the apples dry, losing a little moisture, consequently the gravity of the juice becomes greater, and the resulting cider stronger, than it would be if the apples had been ground when wet.

This is shown by the following results:—

COMPOSITION OF JUICE FROM RED JERSEYS STORED IN LOFT.

| —               | Sp. Gr. | Acid. | Sugar. | Total Solids. |
|-----------------|---------|-------|--------|---------------|
| 22nd Oct. .. .. | 1·0617  | ·15   | 14·70  | 15·44         |
| 5th Nov. .. ..  | 1·0660  | ·16   | 14·92  | 16·14         |



## THE MANIPULATION OF THE APPLES.

In the manufacture of cider at Butleigh an endeavour is made to carry out every improvement in a practical manner, such as could be carried out by any cider-maker without going to unnecessary expense. Although it is essentially an experiment station, no attempt is made to carry out the manufacture of cider in any fanciful or extravagant way.

Sufficient space for storing the apples and allowing them to get dry does not exist there, more especially in such a plentiful year as was 1895, so that frequently the apples had to be ground a few days after being brought into the loft or storing-room.

The apples are brought in, as on most of the farms of the country, in a state which, although it does not satisfy scientific requirements, is universally deemed to be the best that can at present be secured. In other words, more or less material which ought not to be present is brought in with them. How to get rid of this extraneous matter has always been a difficulty, and this year Mr. Neville Grenville overcame it by a simple and yet effective contrivance. A trough of wood, about ten to twelve feet long, twelve inches wide, and with sides seven inches high, was made. This was placed in the storing-room, with one end leading into the shoot which fed the mill, and the other raised about two feet from the floor on a wooden trestle. Along the bottom of this trough, at intervals of about two feet were fixed slips of wood half an inch thick, nailed on diagonally and bevelled off on the side away from the mill. The effect of these strips was to slightly arrest the speed of the apples, and to cause their flow to be alternately from side to side of the trough, as they rolled down the slope from the upper end. A man or boy stood by the trough, and as the apples rolled along picked out all those that were rotten, gathering up from time to time the leaves, stems, pieces of rotten apple, and other extraneous matter which, owing to their inability to roll, were left on the trough, and thus easily separated from the apples. The amount of useless material removed in this way from apples, which to all appearance were fairly clean, was astounding, and would, for every "cheese" made yielding two hogsheads of juice, fill a large basket. The effect of this removal has been most marked, the juice being purer to the taste, and in every respect far more clean than that obtained in former years. It has also caused the colour of the cider to be much lighter than in former years when the rotten apples were left in. I would most strongly recommend cider-makers to adopt this simple system of cleaning the apples.

## APPARATUS.

The totally different style of the apparatus used in France for the manufacture of cider from that which is used in England was most noticeable at St. Brieuc.\* As regards the mills employed for grinding the apples, these differ essentially from those used in England, while nearly every farm at home contains a different kind of mill. The majority of these crush the pips, and this is often thought desirable, but is not supported by the experience of foreign makers nor of many in England. Hence one of the chief characteristics of all foreign mills is, that they are so constructed as not to break the pips. Whether they are better than the English mills, and which of the many used in England are good, are questions for one of the Agricultural Societies to investigate. This is more especially desirable because, when the last trials were held, crushing the pips was considered an essential point in the action of the mill. If in such tests the force expended, the time occupied, the nature of the work done, and the susceptibility of the crushed apples to pressure were recorded—and these could easily be determined by modern appliances in the hands of competent engineers and judges—the results would prove of the utmost value to cider-makers.

With regard to the presses. Further experiments were made during last season with the foreign (Lumley's) press described in my Report for 1894.

The pomace instead of being packed into the case as formerly was divided into layers by means of thin gratings of wood, placed at intervals of about six inches. The iron stem of the press was also surrounded by a wooden grating, and the outer frame was lined with a thin cloth, this being the method which we saw in practice at St. Brieuc.

The result, as regards the quantity of juice expressed, was far more satisfactory than that obtained in 1894, so that where it is desired to obtain all the juice at one pressing, and not to make small cider, the above alterations may be adopted with advantage.

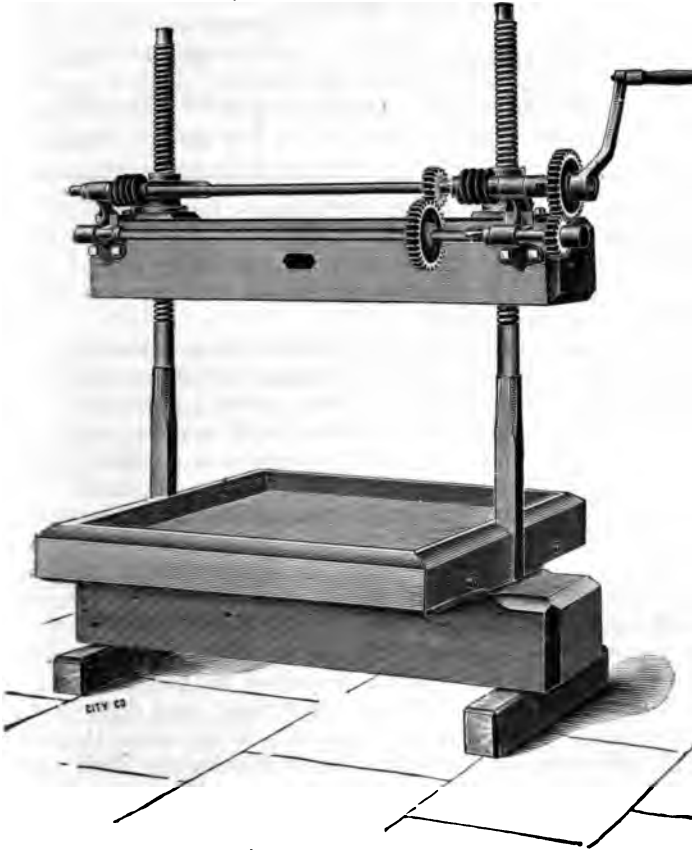
In the experiments made in 1894 the new press gave for 1,000 lbs. of apples 556 lbs. of juice, while the old English press gave 118 lbs. of juice, or a difference of 162 lbs. of juice in favour of the English press. In the experiments made in 1895 under the new conditions above mentioned the foreign press gave 613 lbs. of juice from 1,000 lbs. of apples, while the English press yielded 650 lbs. of juice, showing a difference of only 37 lbs. of juice as compared with 162 lbs. in 1894.

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\* See further, page 126.

### *Experiments on Cider-Making.*

For the experiments in 1895 a new press was procured. This was the quadruple gear hand-press of Messrs. Woll and Sons, shown in the annexed illustration. This press obtained the first prize at the Trials of Cider-Making Apparatus conducted at Glastonbury in 1890, in connection with the trials of the Royal Agricultural Society at Plymouth. The pressure is obtained by means of a mechanical arrangement, by



it is possible either to apply pressure rapidly, or, by a alteration of the gear, to obtain greater pressure, though sarily more slowly. It is claimed for this press that capable of exerting a pressure of eighty tons. Whether t so or not, it has proved an efficient press as compared wit used in 1894. This will be best seen by a study of the foll results of experiments :—

## OLD PRESS.

| —       |       | 1,000 lbs. Pomace.     | Juice. | Pressed Pomace. |
|---------|-------|------------------------|--------|-----------------|
|         |       |                        | lbs.   | lbs.            |
| In 1894 | .. .. | 1st Experiment .. .. . | 693    | 807             |
|         |       | 2nd „ .. .. .          | 748    | 257             |

## NEW PRESS (WORKMAN).

|         |       |                        |     |     |
|---------|-------|------------------------|-----|-----|
| In 1895 | .. .. | 1st Experiment .. .. . | 706 | 294 |
|         |       | 2nd „ .. .. .          | 720 | 280 |
|         |       | 3rd „ .. .. .          | 650 | 350 |

The pomace in each of these experiments was in the press on an average for four hours. The poor result obtained in the third experiment is due to a different mill having been used for grinding the apples. This shows how much influence the mill has upon the results obtained.

While watching two or three powerful men labouring to obtain sufficient pressure upon the pomace to extract all the juice, the thought arises, could not this power be obtained far more easily and at less cost by some more simple method? Surely in no other industry where pressure is required is it obtained in so primitive a fashion, and it is impossible to believe that this method will long remain in vogue. The most efficacious method of obtaining pressing power is by hydraulic force. Already in large establishments the hydraulic press is used, but unfortunately its high price prevents it for the present becoming more generally employed.

The "cheese" was made up, as in former years, with manilla cloths, upon the system described in the 'Journal' for 1893-94. As these cloths are very thick and difficult to wash, it occurred to Mr. Neville Grenville to try some thinner material. He obtained some thin but coarse strong cloth, and experiments made with it tended to show that a very thick cloth is not necessary. The tannin in the apple soon tans the thinner cloth and renders it very strong, while being flexible it is far more easily washed. The cost of these cloths is also much less than that of the manilla cloths, but how long they will last has yet to be determined.\*

*The Colour of Cider.*—It is commonly believed in the West of England that unless cider has a deep colour it is deficient in

\* Further experiments will be made next year, and the subject reported on fully.

body or strength. As is well known, if broken apples be exposed to the light and air they soon become discoloured. Hence some makers keep the ground pomace for a night or more before it is made up into a cheese. This subject seemed worthy of investigation, so the following experiments were made. Two cheeses were ground, one made up and pressed at once, the other after twenty-four hours, and the juice from the second cheese was certainly more highly coloured than that from the first cheese.

In a second experiment two lots, each of 1,000 lbs. of apples, were ground, the first lot being pressed immediately, and the second after twenty-four hours. Again the juice of the second lot was darker, and the following results were obtained :—

| —             | Weight of Apples. | Weight of Pressed Pomace. | Weight of Juice. |
|---------------|-------------------|---------------------------|------------------|
|               | lbs.              | lbs.                      | lbs.             |
| 1st Lot .. .. | 1,000             | 294                       | 706              |
| 2nd Lot .. .. | 1,000             | 280                       | 720              |

The difference in quantity is only such as might occur between any two cheeses.

The results of the analysis of the juice from these experiments are as follows :—

ANALYSES OF JUICE.

| —   | Sp. Gr. | Acid. | Sugar. | Tannin. | Total Solids. |
|---|---------|-------|--------|---------|---------------|
| t.—Pressed as soon as ground ..                 | 1·0539  | ·43   | 11·36  | ·30     | 13·02         |
| nd.—Pressed 24 hrs. after grind-<br>ing .. .. . | 1·0533  | ·44   | 11·11  | ·17     | 12·80         |

The second experiment yielded the following results :—

| —   | Sp. Gr. | Acid. | Sugar. | Tannin. | Total Solids. |
|---|---------|-------|--------|---------|---------------|
| t.—Pressed as soon as ground ..                 | 1·050   | ·36   | 10·87  | ·29     | 11·98         |
| nd.—Pressed 24 hrs. after grind-<br>ing .. .. . | 1·051   | ·41   | 10·87  | ·24     | 12·40         |

The variations being slight indicate that no considerable chemical change is produced by keeping, except a similar change to that which occurs when the apples are allowed to

rot, namely, that some of the tannin appears to be precipitated, and not to enter the juice. Now, as the presence of tannin is considered necessary, not only as a means of keeping the juice, but of obtaining it clear and bright, it would seem that, regarded from this point of view alone, it is best to press the pomace as soon after grinding as possible.

The above experimental juices were analysed every fortnight, and, so far as can be judged at the time of writing, there is no marked difference between them.

*Maignen's Filter.*—Some experiments have been made with this filter which is fully described in the Report of the visit to St. Brieuc. In the first experiment, it was found difficult to pass the juice through the filter with sufficient rapidity. A second experiment was made with juice which had been first keeved and skimmed, and it was then found to pass through the filter with a fair amount of rapidity. As there can be no doubt that the purer the juice is before it is put into the fermenting barrel, the better is the resulting cider, it is evident that this filter will supply a want, being both cheap and efficacious, though slow. It is not suitable for the filtration of the fermented juice, because, when this is filtered, it is specially necessary to keep it, so far as possible, from exposure to the air. And this is, in my opinion, one of the great advantages of the "Invicta" filter, described in the Report of 1894.

*Keeving.*—Most of the juice was keeved, but, owing to the exceptionally cold weather which prevailed during the end of October, a new experience was obtained. The juice at the low temperature (40° Fahr.) which it possessed during this period would not form any head, fermentation being at a standstill. An attempt was made to warm the juice artificially to 60° Fahr.; but, owing to the want of special and suitable apparatus, this was not easily done, though a head was obtained as usual. Observations of temperature have been made regularly, and it is evident that unless the juice is at a temperature of about 52–58° Fahr., or can be kept in a room artificially heated, so that when standing in the keeve it will gradually rise to this temperature, it is not advisable to keeve the juice, for no beneficial results would follow.

Whenever the temperature permitted, the juice has been keeved. The keeves were filled only to within 1 foot of the top and covered over with a loose wooden cover, the head being removed once or twice. Care must be taken when racking off not to disturb the bottom sediment. With care in carrying out this process, the results are well worth the trouble entailed. The juice is not only considerably clarified—and to get the juice clear must be the constant effort of the cider-maker—but as much as the subsequent fermentation is slower and more variable it is capable of being better controlled.

*Ventilation of the barrels.*—When the keeved juice is first placed in the barrels, it is necessary that the gas produced by fermentation should escape, while, at the same time, air should be excluded. The air-excluding bungs, which were made for experimental purposes and described in the Report for 1894, were again used, but, as a large number of barrels were not intended for experimental work, a more simple arrangement was adopted for these. The end of a piece of composition tubing, about 1 foot in length, was carefully fixed in a bung or shive, which was fastened securely into the barrel, the tube was then bent round so that the end came about 2 inches above the top of the barrel, and under this end was placed a tumbler of water into which the tube dipped. This arrangement was found satisfactory, and has the advantage of being cheap and easily fitted up by anyone. A better plan would be to use tinned-iron pipes, which could be screwed securely into the wooden shives. By watching the rate at which the gas bubbles through the water a good idea may be obtained as to the rate at which the fermentation is taking place.

One of the first questions which arises in the treatment of the juice is, should the gas be allowed to escape by means of these tubes, or should the casks be bunged down as soon as filled? Looking at this question from a purely scientific standpoint, it seemed to me preposterous to bung down the casks as soon as they were filled. For one of two results must take place, either the fermentation would be stopped, owing to the pressure exerted by the carbonic acid gas produced in the barrel, or, if it proceeded, then the amount of gas formed would be sufficient to burst the barrel or cause it to leak. However, a barrel was bunged down as an experiment, and as it did not burst, I naturally concluded that the pressure had been sufficient to stop fermentation. After a while a sample was drawn and analysed, and the following results obtained:—

COMPOSITION OF JUICE IN A BARREL BUNGED DOWN.

| —                             |         | Sp. Gr. | Acid. | Alcohol. | Sugar. | Total Solids. |
|-------------------------------|---------|---------|-------|----------|--------|---------------|
| Juice when racked into barrel | ..      | 1·052   | ·70   | ..       | 19·80  | 12·82         |
| After two months              | .. .. . | 1·040   | ·85   | 5·05     | 1·87   | 3·80          |

Thus, it will be seen that fermentation had proceeded just as if the barrel had been open. In fact, when compared with the barrel next filled, from which the gas was allowed to escape, it was found that fermentation proceeded more slowly in the barrel not bunged down.

**COMPOSITION OF JUICE IN A BARREL WITH AIR-EXCLUDING BUNG.**

| —                                | Sp. Gr. | Acid. | Alcohol. | Sugar. | Total Solids. |
|----------------------------------|---------|-------|----------|--------|---------------|
| Juice when racked into barrel .. | 1·052   | ·44   | ..       | 11·23  | 12·92         |
| After two months .. .. .         | 1·018   | ·73   | 3·80     | 3·78   | 5·30          |

From these figures it is evident that fermentation had proceeded in the tightly bunged down juice just as if the barrel had been merely closed with the air-excluding bung, and the gas allowed to escape. But how had the gas escaped, for it certainly had been formed, and was not present in the juice? To determine this point two barrels were taken and fitted up with pressure gauges. The pressure rose rapidly, and in about from two to three days amounted to 2 lbs. on the square inch. Beyond this, the pressure did not rise. So far as one could judge, it seemed to fluctuate very slightly from day to day. The conclusion to which I have come in explanation of these facts is, that when the pressure reaches 2 lbs. to the square inch, the staves of the barrel, where not in contact with the liquid, must permit of some gas escaping. The pressure immediately falls again very slightly, then rises until once more it is sufficient to open the staves and obtain an exit. This would account for the slight fluctuations noticeable in the pressure.

An experiment was made to see if, by keeping the juice under this pressure, fermentation was in any way retarded. The following figures show the rate of fermentation in two barrels of juice made on the same day, one of which contained an air-excluding bung, the other, a pressure gauge which indicated a pressure of 2 lbs. to the square inch:—

**COMPOSITION OF TWO BARRELS OF CIDER, ONE BUNGED DOWN WITH PRESSURE GAUGE IN, THE OTHER WITH AIR-EXCLUDING BUNG.****1.—BUNGED WITH AIR-EXCLUDING BUNG.**

| Date.           | Sp. Gr. | Alcohol. | Acid. |
|-----------------|---------|----------|-------|
| 6th Dec. .. ..  | 1·0205  | 3·60     | ·68   |
| 17th Jan. .. .. | 1·0080  | 4·90     | ·73   |

**2.—BUNGED TIGHT. PRESSURE GAUGE INDICATING 2 LBS. TO SQ. INCH.**

| Date.           | Sp. Gr. | Alcohol. | Acid. |
|-----------------|---------|----------|-------|
| 6th Dec. .. ..  | 1·0210  | 3·60     | ·64   |
| 17th Jan. .. .. | 1·0075  | 4·95     | ·77   |



It will be noticed that both in the above experiment, as also in the one previously referred to, fermentation proceeded more rapidly in the juice under pressure.

*When to Rack or Filter.*—One of the problems to which much attention has been given has been how best to preserve the juice. Customs vary greatly, more especially as to the time of bunging down the casks and the means which should be taken before this is done to clarify the juice. Some makers even consider that it is best to bung down on the lees without clarifying. The result of an experiment made in 1894, which was not completed when the last Report was written, seemed to indicate that by bunging down on the lees more harm than good would arise. Further experiments have been made on this point, and they confirm last year's results.

Some makers think it desirable to rack before bunging down. This entails exposing the cider to the air, which is overcome so far as possible by sulphuring the casks into which the cider is to be racked, and by using a pump for racking the cider from the one barrel into the other. In this way not only is the cider clarified, but the sulphur fumes (sulphurous acid) present in the barrel are to a certain extent absorbed by the juice, and act both as a preventive of further fermentation and also as a preservative of the cider.

But whether the cider is racked or filtered, the question of most importance is, when should this racking or filtration take place? Upon this subject much work has been done, but I am not yet in a position to give definite advice. The following considerations may, however, be found of some advantage to practical men. There must be some definite basis to guide the operation if the work is to be done systematically. What should this basis be? I can only think of two possible means of judging when the cider should be racked or filtered; the first is, the clearness of the juice, the second, the extent of the fermentation. Now, so far as I can judge at present, the clearness of the juice will depend more upon the state of the weather and other causes than upon the degree of fermentation which has taken place in the juice; also it will depend partly upon the kind of fermentation which is taking place. Thus, in some experiments with pure cultures of yeast, the juice attains a clearness even while the fermentation is proceeding, which it does not reach under ordinary fermentation, and this occurs long before it would be right either to filter or to rack. In other cases the cider will ferment down to dryness, that is until no more sugar remains in the juice, and still not be clear. So that from the results of experiments made up to the present, it would seem that clearness is not a reliable guide.

The only other guide is the composition of the juice; in other words, the extent to which fermentation has proceeded. Experiments have been made to try and determine at what precise time during the fermentation it would be best to rack or filter.

If ease of filtering were the chief consideration, then it would be best to wait until the juice was fermented to dryness. But this has one great disadvantage. During filtration or racking, the gas (carbonic acid), which is dissolved in the cider, and which helps materially to preserve it, would be lost, and as there would be no sugar left for the production of more gas by subsequent fermentation, the cider would not only be flat, but most probably would not keep. Hence it is necessary to filter or rack the juice before it has fermented to dryness. Now arises the principal problem. How much sugar ought to be present in the juice when it is filtered to ensure sufficient subsequent fermentation for the cider to be bright, or "in good condition," and to keep well?

If the results of the experiments with pressure gauges, previously referred to, can be relied upon, it would seem that the maximum pressure which a cask will withstand without leaking is about 2 lbs. to the square inch. To obtain more than this would seem to be of little use, so that if sufficient sugar could be left in the juice to ensure, by its subsequent fermentation, an amount of gas which would produce this pressure, this would presumably be sufficient for all practical purposes.

Any calculation as to what amount of sugar would be required to produce this result, owing to the solubility of the gas in the liquid, is both difficult and uncertain, and only practical experiment can finally settle the point. Meantime, it seems to me that it is necessary to have about 3 per cent. of sugar in the juice when it is racked or filtered and finally bunged down. Now how can the ordinary cider-maker determine this point? The question appeared of such importance that an attempt has been made to solve the difficulty by preparing the table on the opposite page, which is based upon the results of the observations during the past three years, and may, as experience increases, have to be revised. To make use of the table it is necessary to employ an accurate hydrometer for determining the specific gravity of the juice. This instrument is indeed as necessary to the cider-maker as the thermometer is to the butter-maker. A book should be kept, and in this should be entered the specific gravity of the juice of each barrel as it is filled, the barrel being numbered at the same time. From time to time, as fermentation proceeds, some of the juice should be drawn off and the

TABLE SHOWING THE PERCENTAGE OF SUGAR AND ALCOHOL IN FERMENTING JUICE PROVIDED THE SPECIFIC GRAVITY OF THE ORIGINAL JUICE IS KNOWN.

(Present Gravity.)

| Original Gravity. | 1065   |          | 1060   |          | 1055   |          | 1050   |          | 1045   |          | 1040   |          | 1035   |          | 1030   |          | 1025   |          | 1020   |          | 1015   |          | 1010   |          | 1005   |          | 1000   |          |   |
|-------------------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|--------|----------|---|
|                   | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. | Sugar. | Alcohol. |   |
| 1050              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | 0.0      | 9.3    | 6.8      | 8.1    | 1.2      | 6.9    | 1.8      | 5.7    | 2.4      | 4.7    | 3.0      | 3.8    | 3.5      | 2.9    | 4.0      | 2.0    | 4.5      | 1.1    | 5.0      | ..     | 5.5      |   |
| 1051              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 7.8      | 8.1    | 1.3      | 6.9    | 1.9      | 5.7    | 2.5      | 4.7    | 3.1      | 3.8    | 3.6      | 2.9    | 4.1      | 2.0    | 4.6      | 1.1    | 5.1      | ..     | 5.6      |   |
| 1052              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 8.8      | 8.1    | 1.4      | 6.9    | 2.0      | 5.7    | 2.6      | 4.7    | 3.2      | 3.8    | 3.7      | 2.9    | 4.2      | 2.0    | 4.7      | 1.1    | 5.2      | ..     | 5.7      |   |
| 1053              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 9.8      | 8.1    | 1.5      | 6.9    | 2.1      | 5.7    | 2.7      | 4.7    | 3.3      | 3.8    | 3.8      | 2.9    | 4.3      | 2.0    | 4.8      | 1.1    | 5.3      | ..     | 5.8      |   |
| 1054              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.0      | 8.1    | 1.6      | 6.9    | 2.2      | 5.7    | 2.8      | 4.7    | 3.4      | 3.8    | 3.9      | 2.9    | 4.4      | 2.0    | 4.9      | 1.1    | 5.4      | ..     | 5.9      |   |
| 1055              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.1      | 8.1    | 1.7      | 6.9    | 2.3      | 5.7    | 2.9      | 4.7    | 3.5      | 3.8    | 4.0      | 2.9    | 4.5      | 2.0    | 5.0      | 1.1    | 5.5      | ..     | 6.0      |   |
| 1056              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.2      | 8.1    | 1.8      | 6.9    | 2.4      | 5.7    | 3.0      | 4.7    | 3.6      | 3.8    | 4.1      | 2.9    | 4.6      | 2.0    | 5.1      | 1.1    | 5.6      | ..     | 6.1      |   |
| 1057              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.3      | 8.1    | 1.9      | 6.9    | 2.5      | 5.7    | 3.1      | 4.7    | 3.7      | 3.8    | 4.2      | 2.9    | 4.7      | 2.0    | 5.2      | 1.1    | 5.7      | ..     | 6.2      |   |
| 1058              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.4      | 8.1    | 2.0      | 6.9    | 2.6      | 5.7    | 3.2      | 4.7    | 3.8      | 3.8    | 4.3      | 2.9    | 4.8      | 2.0    | 5.3      | 1.1    | 5.8      | ..     | 6.3      |   |
| 1059              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.5      | 8.1    | 2.1      | 6.9    | 2.7      | 5.7    | 3.3      | 4.7    | 3.9      | 3.8    | 4.4      | 2.9    | 4.9      | 2.0    | 5.4      | 1.1    | 5.9      | ..     | 6.4      |   |
| 1060              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.6      | 8.1    | 2.2      | 6.9    | 2.8      | 5.7    | 3.4      | 4.7    | 4.0      | 3.8    | 4.5      | 2.9    | 5.0      | 2.0    | 5.5      | 1.1    | 6.0      | ..     | 6.5      |   |
| 1061              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.7      | 8.2    | 2.3      | 7.0    | 2.9      | 5.8    | 3.5      | 4.8    | 4.1      | 3.9    | 4.6      | 3.0    | 5.1      | 2.1    | 5.6      | 1.2    | 6.1      | ..     | 6.6      |   |
| 1062              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.8      | 8.3    | 2.4      | 7.1    | 3.0      | 5.9    | 3.6      | 4.9    | 4.2      | 4.0    | 4.7      | 3.1    | 5.2      | 2.2    | 5.7      | 1.3    | 6.2      | ..     | 6.7      |   |
| 1063              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 1.9      | 8.4    | 2.5      | 7.2    | 3.1      | 6.0    | 3.7      | 5.0    | 4.3      | 4.1    | 4.8      | 3.2    | 5.3      | 2.3    | 5.8      | 1.4    | 6.3      | ..     | 6.8      |   |
| 1064              | ..     | ..       | ..     | ..       | ..     | ..       | 10.5   | ..       | 9.3    | 2.0      | 8.5    | 2.6      | 7.3    | 3.2      | 6.1    | 3.8      | 5.1    | 4.4      | 4.2    | 4.9      | 3.3    | 5.4      | 2.4    | 5.9      | 1.5    | 6.4      | ..     | 6.9      |   |
| 1065              | 14.0   | 0        | 13     | 0        | 5      | 12       | 0      | 1        | 5      | 9        | 8      | 2        | 1      | 8        | 6      | 2        | 7      | 4        | 3      | 3        | 6      | 2        | 3      | 9        | 5      | 2        | 5      | 7        | 7 |

specific gravity taken. When the specific gravity is such that the table shows it to contain the amount of sugar required at the time of racking or filtering, then this operation should be proceeded with at once.

By the use of this table and a hydrometer, cider-makers would be able to conduct their operations far more thoroughly than appears to have been the rule in years past, and they may rest assured of this, that the extra time and trouble would be well repaid by the more uniform and better character of the cider they produce, and also by its better keeping qualities.

#### FERMENTATION.

As in former Reports the following table has been drawn out, from the results as yet obtained, to show the progress of fermentation in the juice of the few experimental barrels which are examined regularly.

#### AVERAGE COMPOSITION OF FERMENTING JUICE AT DIFFERENT PERIODS.

| After Commencement of Fermentation. | No. of Samples. | Sp. Gr. | Alcohol. | Acid. | Sugar. | Total Solids. |
|-------------------------------------|-----------------|---------|----------|-------|--------|---------------|
| From Press .. ..                    | 13              | 1.0525  | ..       | .46   | 11.47  | 12.76         |
| 1 week                              | 2               | 1.0447  | 1.40     | .62   | 9.63   | 11.02         |
| 2 weeks                             | 7               | 1.0360  | 1.86     | .60   | 7.66   | 8.96          |
| 3 "                                 | 5               | 1.0308  | 2.54     | .62   | 6.30   | 8.00          |
| 4 "                                 | 7               | 1.0264  | 2.93     | .67   | 5.39   | 7.03          |
| 5 "                                 | 5               | 1.0227  | 3.41     | .69   | 4.65   | 6.25          |
| 6 "                                 | 7               | 1.0204  | 3.54     | .71   | 4.01   | 5.72          |
| 7 "                                 | 5               | 1.0169  | 3.95     | .68   | 3.39   | 4.94          |

The results are far more satisfactory than those obtained in former years. In 1893 the average result of the analyses showed the formation of no less than 63 parts of alcohol for every 100 of sugar fermented. In 1894 a smaller quantity of alcohol was produced, namely, 58 per cent., and now, in 1895, it will be found, from the above table, that the amount produced is about 50 per cent. if calculated on the total solid matter, and only 48 per cent. if calculated on the sugar. This is almost a theoretically correct result. The question naturally arises, how and why has it been obtained this year while it was not obtained in former years? The only explanation which I can offer is this, that as much greater care was taken to keep the apples clean and free from extraneous matter this season than last, while in 1894 greater care was taken than in 1893, a purer fermentation has taken place each year, owing to foreign ferments being kept out of the juice. This too, probably accounts for the fact that the

cider produced has been better each year, and possesses a better and purer flavour this year than during the preceding two, even though the juice was not of exceptionally rich quality. This view is also supported by the fact that each season the cider made with a pure yeast has undoubtedly possessed the best flavour and aroma—"bouquet"—of any cider made in the course of these experiments.

*Pure Yeast.*—In a juice fermented with a pure yeast fermentation proceeds more slowly, the juice keeps much clearer, and, if desired, the sweets (sugar) may be retained longer than is possible when the juice is allowed to ferment naturally. But to succeed with a pure yeast, it is essential to employ sufficient to adequately inoculate the juice at the commencement. Owing to a want of sufficient pure yeast, some of the experimental barrels of 1894 fermented far too slowly. This has been guarded against this season, and the result is an undoubted improvement.

The many causes which affect fermentation, and the various kinds of fermentation which are set up in apple-juice, will take some years to investigate. Thus all writers upon cider state that the white frothy fermentation so often seen is detrimental to the manufacture of a good cider. The cause of this white fermentation is not yet known. Some observations have been made with a view of determining what difference there is between the fermentation of a juice giving a white frothy head, and one giving a brown solid head in keiving. So far as can be determined at the time of writing, the juice with a white frothy head has formed more acid and a larger proportion of alcohol out of the sugar than the juice with a brown head, and the cider is of inferior quality.

#### THE EXPERIMENTAL BARRELS OF 1894.

Some of the results of the inoculation experiments have already been referred to. In all, six varieties of yeast were used, and the resulting ciders, although all were originally the same juice, were totally distinct both in flavour and aroma, showing that, to a large extent, these qualities depend upon the particular kind of yeast which produces the fermentation. Of the other barrels, the best was No. 15, and it will be seen that this was one to which sugar had been added. In fact, the results of the experiments on the addition of sugar were most satisfactory, and proved beyond a doubt that the practice is one which can not only be easily carried out, but will enable the maker to produce each year cider of uniform quality. Upon the necessity of this it is needless to insist, for it is self-evident.

Barrel No. 3.—This cider did not improve by keeping, showing that the attempt to neutralise the acid with lime was not a success.

Barrels Nos. 6 & 7.—The object was to discover how much sugar might, without any injurious effect, be left in the juice when this was filtered. Of these No. 6 was better than No. 7, and the question is answered by the fact that No. 15, which contained still more sugar, namely, 3·78 per cent., when bunged down turned out the best cider, showing that, provided the cider contains a fair proportion of alcohol, this amount of sugar may be present when the cider is bunged down for preservation.

Barrels Nos. 8 & 9.—No benefit would seem to occur from leaving the lees in the cider. In fact, the results obtained point to a great improvement following on their removal. Thus, when these ciders were subsequently tasted in the spring of 1895 they were found to be “cloudy, very acid, and of very poor flavour,” while Barrel No. 11 contained good cider.

Barrels Nos. 12 & 13.—The former of these had a “very rough taste and was thick,” while No. 13 was “much better than No. 12, not so rough, good flavour, and clear.”

Barrel No. 15.—My notes say, “contains a fair amount of gas, clear, sweet, soft, and very little acid. Very good.”

Lastly, the “small” cider proved, for its quality, of good flavour.

Such is a description of the work which has been done at Butleigh during the last winter with a view to solve some of the problems connected with cider-making. My assistant, Mr. Wm. D. McCreath, has carried out the work for me in a very thorough manner, and has endeavoured to explain to visitors the nature of the work in progress. That the experiments excite much interest is best shown by the fact that, in all, no less than 143 visits have been made to this Experiment Station, some of the visitors have come long distances for the purpose, and many have repeated their visits once or twice.

It would not be right to close this Report without again thanking Mr. Neville Grenville for the time, trouble, expenditure, and constant attention which he has bestowed upon the cider-making at Butleigh, in order that my every wish should be carried out, and every opportunity afforded me for making these experiments of value to the Society.

COMPOSITION OF THE JUICE OF VARIOUS APPLES.

| Variety.               | No. | Sp. Gr. | Solids. | Acid. | Sugar. | Tannin. | Grower.                 | District.      |
|------------------------|-----|---------|---------|-------|--------|---------|-------------------------|----------------|
| Broad Leaf ..          | 1   | 1·0775  | 19·22   | ·41   | 17·24  | ·48     | J. H. Symes ..          | Marlock S.     |
| Ribston Pippin ..      | 2   | 1·0770  | 18·72   | ·56   | 15·87  | ·15     | R. Neville Grenville .. | Butleigh S.    |
| Little Trott ..        | 3   | 1·0740  | 17·84   | ·44   | 16·66  | ·78     | R. W. Scott ..          | Kingsbury S.   |
| Umbrella ..            | 4   | 1·0735  | 17·70   | ·23   | 16·89  | ·21     | Do. ..                  | Do. S.         |
| Waterman's 5-Guinea .. | 5   | 1·0695  | 17·02   | ·28   | 15·86  | ·25     | J. C. Waterman ..       | Batonsboro' S. |
| Dabinet ..             | 6   | 1·0685  | 16·76   | ·16   | 16·12  | ·27     | R. W. Scott ..          | Kingsbury S.   |
| Court of Wick ..       | 7   | 1·0675  | 15·88   | ·88   | 14·92  | ·13     | R. Neville Grenville .. | Butleigh S.    |
| Kingston Black ..      | 8   | 1·0672  | 16·60   | ·61   | 14·08  | ·11     | Do. ..                  | Do. S.         |
| Naish Bitters ..       | 9   | 1·0670  | 16·46   | ·23   | 14·49  | ·44     | F. J. Hayes ..          | W. Pennard S.  |
| Red Jersey ..          | 10  | 1·0660  | 16·14   | ·16   | 14·92  | ·24     | R. Neville Grenville .. | Butleigh S.    |
| Norton's Bitters ..    | 11  | 1·0660  | 15·74   | ·24   | 14·70  | ·41     | F. J. Hayes ..          | W. Pennard S.  |
| Royal Wilding ..       | 12  | 1·0658  | 15·88   | ·17   | 14·28  | ·19     | G. E. Lloyd Baker ..    | Gloucester G.  |
| Bitter Jersey ..       | 13  | 1·0650  | 16·00   | ·16   | 13·33  | ·25     | G. F. King ..           | Keynsham S.    |
| Handsome Hereford ..   | 14  | 1·0645  | 16·18   | ·24   | 14·49  | ·32     | John Watkins ..         | Hereford H.    |
| Dr. Nash ..            | 15  | 1·0644  | 16·12   | ·16   | 14·49  | ·48     | Mr. Rugg ..             | W. Pennard S.  |
| Brown's Apple ..       | 16  | 1·0643  | 15·62   | ·82   | 13·88  | ·16     | J. H. Hill ..           | Totnes D.      |
| Gins ..                | 17  | 1·0635  | 15·94   | ·17   | 13·88  | ·19     | H. T. Silcox ..         | Butleigh S.    |
| Yellow Bitter Sweet .. | 18  | 1·0630  | 14·98   | ·11   | 14·49  | ·21     | J. H. Hill ..           | Totnes D.      |
| Bitter Scale ..        | 19  | 1·0325  | 15·18   | ·28   | 12·50  | ·37     | J. F. Millard ..        | Butleigh S.    |

COMPOSITION OF THE JUICE OF VARIOUS APPLES—continued.

| Variety           | No. | Sp. Gr. | Solids. | Acid. | Sugar. | Tannin. | Grower.              | District.  |
|-------------------|-----|---------|---------|-------|--------|---------|----------------------|------------|
| Lambrook Pippin   | 20  | 1.0625  | 14.62   | .80   | 14.08  | .89     | J. H. Symes          | Martock    |
| Whisel Jersey     | 21  | 1.0620  | 15.14   | .20   | 14.49  | .85     | Do.                  | Do.        |
| Master's Jersey   | 22  | 1.0615  | 15.36   | .14   | 14.28  | .21     | Mr. Young            | N. Cadbury |
| Bishop's Nose     | 23  | 1.0615  | 14.72   | .76   | 13.33  | .12     | W. Reynolds          | Langport   |
| Revised Foxwhelp  | 24  | 1.0613  | 15.10   | .24   | 14.28  | .35     | Rev. Geo. Herbert    | Ross       |
| King of Bitters   | 25  | 1.0610  | 15.08   | .22   | 13.15  | .24     | G. F. King           | Keynsham   |
| Lester's Bitters  | 26  | 1.0607  | 15.06   | .18   | 13.69  | .36     | F. J. Hayes          | W. Pennard |
| Bastard Punroy    | 27  | 1.0605  | 14.84   | .50   | 12.82  | .14     | W. T. S. Tilley      | N. Wootton |
| Red Cluster       | 28  | 1.0605  | 14.54   | .22   | 12.93  | .17     | Mr. Rendell          | Staverton  |
| White Jersey      | 29  | 1.0600  | 14.92   | .13   | 13.88  | .17     | H. G. Bethell        | Butleigh   |
| Late Bloomer      | 30  | 1.0600  | 13.88   | .14   | 12.50  | .11     | J. H. Hill           | Totnes     |
| Hereford Beesling | 31  | 1.0600  | 13.86   | .83   | 12.50  | .14     | Rev. Geo. Herbert    | Ross       |
|                   | 32  | 1.0598  | 14.26   | .16   | 13.15  | .17     | J. H. Hill           | Totnes     |
|                   | 33  | 1.0595  | 14.70   | .22   | 12.65  | .22     | John Watkins         | Hereford   |
|                   | 34  |         |         | 1.09  | 12.50  | .12     | R. Neville Grenville | Butleigh   |



| No. | Year. | Age.  | Sex. | Color. | Height. | Weight.              | Time. | Place. | Remarks.   |
|-----|-------|-------|------|--------|---------|----------------------|-------|--------|------------|
| 1   | 1870  | 13-34 | 14   | 12-19  | 12      | J. H. Hill           | Do.   | ..     | Totnes     |
| 2   | 1870  | 13-34 | 14   | 12-19  | 12      | Mr. Rugg             | ..    | ..     | W. Pennard |
| 3   | 1870  | 13-34 | 14   | 12-82  | 26      | John Watkins         | ..    | ..     | Hereford   |
| 4   | 1870  | 13-84 | 20   | 12-98  | 23      | W. T. S. Tilley      | ..    | ..     | N. Wootton |
| 5   | 1870  | 13-44 | 43   | 12-34  | 16      | J. H. Hill           | ..    | ..     | Totnes     |
| 6   | 1870  | 13-52 | 18   | 12-50  | 28      | Jas. Watts           | ..    | ..     | Backwell   |
| 7   | 1870  | 13-28 | 67   | 12-65  | 36      | J. H. Hill           | ..    | ..     | Totnes     |
| 8   | 1870  | 13-34 | 63   | 12-04  | 11      | Mr. Rendell          | ..    | ..     | Staverton  |
| 9   | 1870  | 13-24 | 79   | 12-19  | 12      | W. T. S. Tilley      | ..    | ..     | N. Wootton |
| 10  | 1870  | 12-90 | 62   | 12-04  | 08      | R. Neville Grenville | ..    | ..     | Butleigh   |
| 11  | 1870  | 13-58 | 31   | 12-19  | 19      | J. H. Hill           | ..    | ..     | Totnes     |
| 12  | 1870  | 13-42 | 20   | 12-34  | 27      | Jas. Watts           | ..    | ..     | Backwell   |
| 13  | 1870  | 13-80 | 18   | 11-90  | 11      | R. Neville Grenville | ..    | ..     | Butleigh   |
| 14  | 1870  | 13-12 | 86   | 11-90  | 12      | W. Reynolds          | ..    | ..     | Langport   |
| 15  | 1870  | 13-56 | 27   | 12-65  | 11      | R. W. Scott          | ..    | ..     | Kingsbury  |
| 16  | 1870  | 13-52 | 24   | 12-82  | 26      | G. F. King           | ..    | ..     | Keynham    |
| 17  | 1870  | 13-02 | 20   | 12-65  | 19      | F. J. Hayes          | ..    | ..     | W. Pennard |
| 18  | 1870  | 13-38 | 22   | 12-34  | 12      | Do.                  | ..    | ..     | Do.        |
| 19  | 1870  | 13-52 | 12   | 12-19  | 14      | R. Neville Grenville | ..    | ..     | Butleigh   |
| 20  | 1870  | 13-06 | 33   | 12-04  | 08      | J. F. Millard        | ..    | ..     | Do.        |
| 21  | 1870  | 12-54 | 18   | 11-76  | 21      | Mr. Rendell          | ..    | ..     | Staverton  |
| 22  | 1870  | 12-06 | 77   | 10-86  | 14      | R. Neville Grenville | ..    | ..     | Butleigh   |
| 23  | 1870  | 12-40 | 113  | 11-11  | 34      | Do.                  | ..    | ..     | Do.        |
| 24  | 1870  | 12-44 | 49   | 11-11  | 09      |                      |       |        |            |

COMPOSITION OF THE JUICE OF VARIOUS APPLES—continued.

| Variety.                   | No. | Sp. Gr. | Solids. | Acid. | Sugar. | Tannin. | Grower.              | District.  |
|----------------------------|-----|---------|---------|-------|--------|---------|----------------------|------------|
| Unknown .. .. .            | 64  | 1·0529  | 12·46   | ·64   | 11·11  | ·07     | R. Neville Grenville | Butleigh   |
| Honey String .. ..         | 65  | 1·0521  | 12·68   | ·24   | 10·98  | ·07     | H. G. Bethell        | Do.        |
| Worcester Pearmain .. ..   | 66  | 1·0520  | 12·62   | ·26   | 11·76  | ..      | R. Neville Grenville | Do.        |
| Winter Longstem .. ..      | 67  | 1·0515  | 11·96   | ·60   | 11·11  | ·09     | W. Reynolds          | Langport   |
| Unknown .. .. .            | 68  | 1·0510  | 12·44   | ·18   | 11·11  | ·06     | R. Neville Grenville | Butleigh   |
| Vincent's Perfection .. .. | 69  | 1·0510  | 11·76   | ·65   | 10·89  | ·05     | W. T. S. Tilley      | N. Wootton |
| Unknown .. .. .            | 70  | 1·0510  | 12·86   | ·10   | 10·98  | ·09     | R. Neville Grenville | Butleigh   |
| Silcox Seedlings .. ..     | 71  | 1·0507  | 12·50   | ·15   | 11·36  | ·18     | F. J. Hayes          | W. Pennard |
| Seek no Further .. ..      | 72  | 1·0505  | 12·18   | ·77   | 10·10  | ·06     | G. F. King           | Keynsham   |
| Pertheyre .. .. .          | 73  | 1·0503  | 12·18   | ·08   | 11·23  | ·11     | Rev. Geo. Herbert    | Ross       |
| Mother .. .. .             | 74  | 1·0500  | 11·98   | ·85   | 10·75  | ·05     | Rev. F. A. Bryner    | Somerton   |
| Blood Bottle .. ..         | 75  | 1·0496  | 12·06   | ·67   | 10·20  | ·06     | R. Neville Grenville | Butleigh   |
| Cap of Liberty .. ..       | 76  | 1·0492  | 11·70   | ·80   | 10·63  | ·26     | C. Dyer              | Do.        |
| Sweet Valis .. .. .        | 77  | 1·0490  | 11·64   | ·22   | 10·75  | ·16     | W. T. S. Tilley      | N. Wootton |
| Unknown .. .. .            | 78  | 1·0488  | 12·16   | ·10   | 10·98  | ·14     | R. Neville Grenville | Butleigh   |
| Oocagee .. .. .            | 79  | 1·0476  | 11·70   | ·18   | 10·87  | ·11     | Do.                  | Do.        |
| Sour Valis .. .. .         | 80  | 1·0475  | 10·68   | 1·16  | 10·10  | ·21     | W. T. S. Tilley      | N. Wootton |
|                            |     | 1·0475  | 14·66   | 0·40  | 11·76  | ·78     |                      | Butleigh.  |

XIV. — *The Society's 1895 Experiments on Corn.* By the  
STEWARDS OF EXPERIMENTS.

THESE experiments were undertaken with the object of confirming last year's results, in which the application of superphosphate and salt on the furrow before the seed was sown gave better results than the application of these manures when the blade appeared. Plots illustrative of both methods received two top dressings of nitrate of soda, the first application about ten days, and the second about a month, after the seed was sown.

The results of the Barley Experiments of 1895 are unsatisfactory, taken both individually and collectively, as they give contradictory answers to the point which it was desired to elucidate.

INSTRUCTIONS FOR CONDUCTING THE EXPERIMENTS.

The following is a copy of the form issued to the occupiers of the land upon which the experiments were conducted:—

*The object of these experiments is to ascertain the proper time for the application of certain artificial manures to a crop of oats, or to a crop of barley on land upon which wheat or some other corn crop has been harvested in 1894.*

*Care should be taken in the selection of land for these experiments to ensure that the Plots are free from hedgerows, rabbits, &c., and that the quality of the land is the same throughout.*

*The Plots to be half-an-acre each in size and to be divided either by tarred twine attached to stakes, or by some other means which will ensure accurate division at harvest.*

*The Plots, six in number, to be treated as follows:—*

**A.—No Manure.**

**B.—3 cwt. Superphosphate, 3 cwt. Salt,  $1\frac{1}{2}$  cwt. Nitrate of Soda per Acre, i.e.  $1\frac{1}{2}$  cwt. Superphosphate,  $1\frac{1}{2}$  cwt. Salt,  $\frac{3}{4}$  cwt. Nitrate of Soda per Plot.**

*The  $1\frac{1}{2}$  cwt. of Superphosphate to be applied about ten days after the seed is sown, and half of the Nitrate of Soda to be mixed with half of the Salt and applied*

*at the same time but in a separate application from the Superphosphate. The remainder of the Nitrate of Soda and the remainder of the Salt to be mixed together and applied when the blade shows well above ground.*

**C.—3 cwt. Superphosphate, 3 cwt. Salt,  $1\frac{1}{2}$  cwt. Nitrate of Soda per Acre, i.e.  $1\frac{1}{2}$  cwt. Superphosphate,  $1\frac{1}{2}$  cwt. Salt,  $\frac{3}{4}$  cwt. Nitrate of Soda per Plot.**

*The  $1\frac{1}{2}$  cwt. of Superphosphate to be applied on the furrow before the harrowing is commenced, and two-thirds of the Salt to be applied at the same time but in a separate application. The remainder of the Salt to be mixed with the Nitrate of Soda, half of which should be applied about ten days after the seed is sown, and the remainder when the blade shows well above ground.*

**D.—No Manure.**

**E.—3 cwt. Superphosphate, 3 cwt. Salt,  $1\frac{1}{2}$  cwt. Nitrate of Soda per Acre, i.e.  $1\frac{1}{2}$  cwt. Superphosphate,  $1\frac{1}{2}$  cwt. Salt,  $\frac{3}{4}$  cwt. Nitrate of Soda per Plot.**

*The  $1\frac{1}{2}$  cwt. of Superphosphate to be applied about ten days after the seed is sown, and half of the Nitrate of Soda to be mixed with half of the Salt and applied at the same time but in a separate application from the Superphosphate. The remainder of the Nitrate of Soda and the remainder of the Salt to be mixed together and applied when the blade shows well above ground.*

**F.—3 cwt. Superphosphate, 3 cwt. Salt,  $1\frac{1}{2}$  cwt. Nitrate of Soda per Acre, i.e.  $1\frac{1}{2}$  cwt. Superphosphate,  $1\frac{1}{2}$  cwt. Salt,  $\frac{3}{4}$  cwt. Nitrate of Soda per Plot.**

*The  $1\frac{1}{2}$  cwt. of Superphosphate to be applied on the furrow before the harrowing is commenced, and two-thirds of the Salt to be applied at the same time but in a separate application. The remainder of the Salt to be mixed with the Nitrate of Soda, half of which should be applied about ten days after the seed*

*is sown, and the remainder when the blade shows well above ground.*

*For convenience of application the Superphosphate will be in bags of  $1\frac{1}{2}$  cwt. each, the Salt in bags of  $1\frac{1}{2}$  cwt. each, the Nitrate of Soda in bags of  $\frac{3}{4}$  of a cwt. each.*

*These artificial manures will be provided by the Society and forwarded to the nearest railway station.*

*The dates of the application of the several Manures, and the date of the Seed being sown to be carefully recorded. The Crops of each Plot to be threshed as soon as possible after harvest, and their produce, natural weight per bushel and weight of straw ascertained, so that all these particulars may be entered on the Form B (to be hereafter sent).*

As will be observed from the perusal of the instructions, the scheme was confined to three Plots in duplicate, viz. :—

A and D. No manure.

B and E. Late application of Superphosphate and Salt.

C and F. Early application of Superphosphate and Salt.

A top dressing of Nitrate of Soda to all the manured Plots.

The experiments were confined to six stations, and it may be well to give the results arrived at, and to comment on each individually.

**Mr. W. ASHCROFT, Layhams, near Hayes, Kent.**

| Plot. | Produce per Acre. |            |            |            |             |           |           | Natural Weight per Bushel. |
|-------|-------------------|------------|------------|------------|-------------|-----------|-----------|----------------------------|
|       | Head Corn.        |            | Tail Corn. |            | Straw.      |           |           |                            |
| A     | bush.<br>26       | lbs.<br>14 | bush.<br>1 | lbs.<br>35 | cwts.<br>11 | qrs.<br>3 | lbs.<br>0 | lbs.<br>57                 |
| B     | 40                | 48         | 1          | 25         | 18          | 3         | 14        | 57                         |
| C     | 44                | 26         | 1          | 25         | 19          | 0         | 26        | 57                         |
| D     | 31                | 49         | 1          | 75         | 14          | 1         | 16        | 57                         |
| E     | 43                | 17         | 1          | 33         | 19          | 0         | 22        | 57                         |
| F     | 40                | 46         | 1          | 25         | 17          | 2         | 0         | 57                         |

These results when considered in duplicate are contradictory, C being better than B, but on the other hand E being rather

better than F. When the average is struck the early application is about 32 lbs. to the good.

**Mr. JOHN BENNETT, Park Farm, near Ross, Herefordshire.**

| Plot. | Produce per Acre. |      |            |      |              |  | Natural Weight per Bushel. |
|-------|-------------------|------|------------|------|--------------|--|----------------------------|
|       | Head Corn.        |      | Tail Corn. |      | Straw.       |  |                            |
| A     | bush.             | lbs. | bush.      | lbs. | Not weighed. |  | lbs.                       |
|       | 28                | 0    | 1          | 46   |              |  | 58                         |
| B     | 31                | 2    | 2          | 4    |              |  | 58                         |
| C     | 36                | 0    | 1          | 39   |              |  | 59                         |
| D     | 26                | 56   | 2          | 24   |              |  | 58                         |
| E     | 32                | 0    | 2          | 0    |              |  | 58                         |
| F     | 37                | 21   | 1          | 51   |              |  | 59                         |

This station on the whole gives the most satisfactory results, C being better than B, and F than E, in about the same proportion. The results are not contradictory in themselves, and they corroborate those arrived at last year, being decidedly in favour of the early application: this year by 5 bush. 11 lbs.; last year by about 2 bushels.

**Mr. F. D. BROCKMAN (Mr. Lipscomb), Beachborough, near Shorncliffe, Kent.**

| Plot. | Produce per Acre. |         |            |        |         |                | Natural Weight per Bushel. |
|-------|-------------------|---------|------------|--------|---------|----------------|----------------------------|
|       | Head Corn.        |         | Tail Corn. |        | Straw.  |                |                            |
| A     | bush. 32          | lbs. 14 | bush. 1    | lbs. 6 | cwt. 11 | qrs. 1 lbs. 14 | lbs. 56                    |
| B     | 40                | 32      | 2          | 22     | 15      | 2 0            | 56                         |
| C     | 40                | 12      | 2          | 20     | 16      | 0 26           | 55½                        |
| D     | 33                | 33½     | 0          | 52     | 12      | 2 22           | 56½                        |
| E     | 42                | 48      | 1          | 23½    | 17      | 2 20           | 56½                        |
| F     | 40                | 8       | 1          | 15½    | 18      | 0 10           | 56½                        |

Last year the results at this station were very slightly in favour of the early application, and this year there is a balance of 1 bush. 2 lbs. in favour of late application.

**Mr. GEORGE GIBBONS, Tunley Farm, Bath.**

| Plot. | Produce per Acre. |           |            |            |             |           | Natural Weight per Bushel. |            |
|-------|-------------------|-----------|------------|------------|-------------|-----------|----------------------------|------------|
|       | Head Corn.        |           | Tail Corn. |            | Straw.      |           |                            |            |
| A     | bush.<br>24       | lbs.<br>2 | bush.<br>1 | lbs.<br>31 | cwts.<br>19 | qrs.<br>0 | lbs.<br>0                  | lbs.<br>53 |
| B     | 39                | 3         | 2          | 8          | 28          | 2         | 0                          | 58         |
| C     | 38                | 4         | 1          | 51         | 26          | 0         | 0                          | 53         |
| D     | 32                | 6         | 2          | 0          | 20          | 0         | 0                          | 53         |
| E     | 39                | 10        | 2          | 18         | 28          | 0         | 0                          | 54         |
| F     | 32                | 32        | 2          | 0          | 25          | 0         | 0                          | 55         |

This year's results are contrary to those of last year when the early application showed to advantage. The great drop (for which there seems no explanation) in the produce of F, as compared with the other manured Plots, makes this difference the more marked; and we find that on comparing the average produce of C and F with that of B and E there is a difference of 3 bush. 44 lbs. in favour of the late application; whereas last year there was a difference of 2 bushels in favour of the early application.

**Mr. THOMAS RICH, Polsue, Probue, Cornwall.**

| Plot. | Produce per Acre. |         |            |        |          |        | Natural Weight per Bushel. |         |
|-------|-------------------|---------|------------|--------|----------|--------|----------------------------|---------|
|       | Head Corn.        |         | Tail Corn. |        | Straw.   |        |                            |         |
| A     | bush. 39          | lbs. 43 | bush. 1    | lbs. 3 | cwts. 16 | qrs. 2 | lbs. 26                    | lbs. 53 |
| B     | 41                | 45      | 1          | 9      | 20       | 0      | 16                         | 53      |
| C     | 40                | 38      | 1          | 9      | 16       | 3      | 8                          | 53      |
| D     | 36                | 38      | 1          | 1      | 16       | 2      | 24                         | 53      |
| E     | 43                | 3       | 1          | 13     | 18       | 2      | 24                         | 53      |
| F     | 33                | 3       | 1          | 25     | 16       | 3      | 10                         | 53      |

These Plots cannot be compared in duplicate, as a great portion of Plot F was scorched. Dealing therefore with B and C only we find that the late application shows a better result by 1 bush. 7 lbs. than the early application.

**Mr. T. T. STACEY, Winterbourne, Kingston, Blandford, Dorset.**

| Plot. | Produce per Acre. |      |            |      |        |      | Natural Weight per Bushel. |
|-------|-------------------|------|------------|------|--------|------|----------------------------|
|       | Head Corn.        |      | Tail Corn. |      | Straw. |      |                            |
|       | bush.             | lbs. | bush.      | lbs. | cwts.  | qrs. | lbs.                       |
| A     | 43                | 26   | 1          | 0    | 17     | 0    | 4                          |
| B     | 52                | 52   | 0          | 18   | 25     | 1    | 2                          |
| C     | 35                | 25   | 0          | 32   | 24     | 3    | 24                         |
| D     | 50                | 26   | 0          | 12   | 19     | 3    | 2                          |
| E     | 54                | 26   | 0          | 14   | 23     | 0    | 32                         |
| F     | 50                | 0    | 0          | 18   | 20     | 3    | 24                         |

Here again Plots E and F must be eliminated, the latter being much damaged by weather. Comparing B with C we find a balance in favour of the early application of 2 bush. 30 lbs.

These results are somewhat surprising, as in May four out of the six stations reported that the Plots C and F, to which the manures had been applied early, held a decided lead over everything else.

Putting the results of the six stations (as given above) together it appears that three stations show a collective gain of 6 bush. 52 lbs. in favour of late application, and the other three a collective gain of 7 bush. 43 lbs. in favour of early application.

It seems a great pity that such an indefinite result should have been arrived at, more particularly as the condition of the Plots in May led one to expect otherwise. These disappointing issues were no doubt largely brought about by the prolonged drought of May and June.

As a side issue it may be observed that the increase in yield in the manured as compared with the unmanured Plots is considerable, ranging from 2 bushels to 12 bushels and averaging nearly 8 bushels.

The Committee desire to express their best thanks to those gentlemen who have so kindly assisted them in the conduct of these experiments.



XV.—*Report upon the Society's Experiments for the Improvement of Permanent Pasture.* With Introduction by C. T. D. ACLAND, Acting-Chairman of the Experiments Committee.

INTRODUCTION.

THE Experiments Committee have during the last three or four years entertained a strong desire to devise some method which they might with confidence recommend to the Council for carrying out in a practical manner experiments on the cultivation of grass, and this has been the subject of long and earnest discussion with them on several occasions. Among the various obstacles which confronted them, the principal difficulty was that of determining, either from a scientific or from a practical point of view, the result of any kind of experiment on grass in such a manner that the conclusion might be of real value. This difficulty, great as it must be in any case in which the expenditure has to be kept at a very low figure, was increased by the endeavour of the Committee to adhere to the principle which in all former experiments conducted by the Society had been constantly maintained, namely, that the procedure should be uniform in every case.

The Committee, however, became so much impressed with the importance of dealing with the subject, that rather than incur any further delay by discussion which bid fair to be fruitless, they determined to surrender, at any rate for the time, the principle of uniform procedure.

The fact that a large quantity of land had been laid down with very varying success during the last few years, induced them to believe that the time had come when it was worth while to make this surrender. There could be no lack of material to experiment upon with a fair prospect of interesting and beneficial experience as the result. Moreover, two obvious reasons favoured, for the time being, the abandonment of the principle in question. First, a procedure which might commend itself as eminently desirable in certain districts and on certain soils might be known to be useless, if not actually harmful, in other localities. Secondly, to insist, merely for the sake of uniformity, upon a procedure which is known beforehand to be erroneous, and therefore expensive and wasteful, would be likely to prejudice the experiments in the eyes of the agriculturists of the neighbourhood, whose favourable attention is our chief object to gain.

The Committee, therefore, unanimously determined that another and more directly useful method should be adopted

They have to regret that they were so restricted in the matter of funds, that a small beginning only could be made; but they hope that if the few experiments now set on foot can be successfully carried through, the Council may see its way to enable them to add to their number. The method which it has been decided to adopt is as follows.

Pieces of grass land have been selected in various parts of the area of the Society's operations, and in their selection the Committee have been mainly influenced by the following considerations, viz.:

1. That there should be a variety in regard to soil and climate.
2. That the sites should be widely distant from each other.
3. That each site should be typical of a large and important district.
4. That each experiment should be on a farm, the occupier of which should be able and willing to further the objects of the Committee, and have such intelligence and experience as would enable him to do so satisfactorily.

With these points in view it was further sought to obtain pieces of land where the grass had not been laid down many years, and was clearly in a condition admitting of improvement. Six such sites have been selected by the Stewards of Experiments, and are now reported upon.

The first step taken upon each site was to enclose firmly a small piece two hurdles square in a typical part of the field. It is intended that during the continuance of the experiment this small piece shall in each year, during the whole period of the annual growth of the grass-plant until the seeds have been shed, be firmly fenced in and defended from stock, rabbits, &c. The hurdles will then be taken down for the winter, and the piece subjected to the same treatment as the rest of the field, with the exception of the application to it of any manure or renovating seeds. An exhaustive report has been made of the grasses and other plants found growing within this small square upon each of the sites selected, and similar reports will be made annually during the continuance of the experiments. For the purpose of ascertaining any results that may be produced by the experimental procedure adopted on other parts of the field, annual reports will be made of such parts for comparison with the hurdled-off portion.

The reports already made have been submitted to the Consulting Chemist and Consulting Botanist, and samples of the soil have been analysed. After consultation with practical men, well acquainted with the particular district in which the experiment is being conducted, a course of procedure has been suggested by Dr. Voelcker, in conjunction with Mr. Carruthers. The

Stewards have undertaken to see that such procedure is carefully carried out.

It is intended that the experiment, observation, and report on each site shall be continued for such a number of years as may suffice to lead to a practical conclusion, *i.e.* to the formation of some obviously well-founded inference on the advantage or otherwise of the method of treatment adopted. It may even be desirable to have more than one course of experiments upon the same site.

The main objects in view have been—

1. To obtain a careful record of the results of the treatment adopted.

2. To use the record for the accumulation of beneficial experience.

3. To draw the attention of farmers to the practical importance of various details as illustrating principles, and to the variety of methods of treating grass-land which are in vogue in various districts.

It is hoped that this series of experiments may not only prove to be of considerable practical value to persons who are already interested in the successful cultivation of grass, but that they may also furnish in an annually increasing degree useful and attractive object-lessons to those who are engaged in giving instruction in the sciences applicable to agriculture.

They will afford valuable opportunities for observation and inference upon the growth and habit of various grasses; they will serve to familiarise the agricultural student with the nomenclature and classification of the elements of pasture; they will provide interesting groups of simultaneous illustrations of the effect of various methods of treatment of various plants, upon various soils, and under a variety of circumstances, without, it is hoped, any conscious departure from the lines indicated by good practice and economy. If these hopes are realised, the educational value of these experiments will be little, if at all, inferior to their value from the purely agricultural point of view, and this should afford additional justification for the almost inevitable increase of expenditure that will have to be incurred in their continuance and amplification.

With a view of rendering this experimental work as useful, from an educational point of view, as possible, detailed particulars of it will be sent to the Educational Committee of each county within the limits of which operations are being conducted; and such Committees have been invited to co-operate with the Society in making known the objects and results of the experiments now in progress.

The first visit of inspection to five out of the six selected

sites was paid in June last. The sixth site was visited in September. The object of this preliminary inspection was to acquire precise information as to the nature of the herbage and character of growth generally on each site, as well as to institute a careful comparison of the portion selected for experiment with the rest of the field with a view to determining the representative character of that portion. Furthermore, the small portion enclosed by hurdles at or about the centre of the experimental area (and referred to as the "hurdled portion") is to be subjected to close inspection, and a complete list made of the grasses, clovers, and other plants comprised therein. The idea is that the hurdled portion shall be employed for purposes of comparison with the experimental area at different periods of its treatment. The extent of the experimental area, it should be mentioned, is in each case about 5 acres; the hurdled portion being about a couple of hurdles square.

A special feature of the work to be undertaken is that the Committee have provided for the keeping of a manuscript book at each of the farms, in which a complete record of the site and its treatment will be entered from time to time by the tenant with the assistance of the Society's Botanical Visitor. These Record Books have been printed, and include scheduled pages for the following purposes:—(a) A detailed account of each inspection made by the Botanical Visitor; (b) The subdivision of the experimental area, with the methods proposed for its treatment (with map); (c) Record of treatment of each sub-division of the experimental area during the various seasons of the year.

The recording of these details cannot fail to have an important bearing upon the experiments, and it is matter for congratulation that the occupiers have shown much willingness to co-operate with the Society and its advisers in this and other matters connected with the work.

Below are given in order the particulars furnished by the occupiers, and reports by the Society's Consulting Chemist and Consulting Botanist and by the Botanical Visitor, with regard to each site. It must be borne in mind that the visits of the Consulting Botanist and those of the Botanical Visitor were some weeks apart.

EXPERIMENTAL SITE NO. 1, AT TALATON, OTTERY ST. MARY,  
DEVON.

Owned by Sir John Kennaway, Bart., and occupied by Mr. George Daw, of Larkbere Farm, Ottery St. Mary, who furnishes the following particulars:—

|   |   |
|---|---|
| Nearest railway station .. ..   | Whimple (L. & S. W. R.).  |
| Distance from ditto .. ..   | One mile and a half.  |
| Name of Field .. ..   | Sicklands.  |
| Area .. ..  | Eleven acres.   |
| Character of top soil .. ..   | Clay.   |
| Thickness of ditto .. ..  | Six to seven inches.  |
| Nature of surrounding country ..  | Hilly.  |
| Slope of Field .. ..  | Towards the north.  |
| Situation .. ..   | Not near cattle yard.   |
| Nature of grass .. ..   | Much alike in quality throughout.   |
| Length of time known to have been<br>laid down to grass .. ..                           | Eight years.  |
| When sown .. ..   |   |
| Description of grass seeds sown ..  | In the spring with a cereal crop.   |
|   | Red and white clover, alsike, Italian,<br>Devon Evers. No others have<br>been sown since. |
| When mown or grazed .. ..   | Twice mown in 1894.   |
| Tendency of herbage .. ..   | To scorch in a dry summer.  |
| Manures last applied .. ..  | In 1894.  |
| Description of ditto .. ..  | Mixed.  |
| Feeding stuffs used during last<br>five years for the cattle grazing<br>the field .. .. | Corn.   |
| Reputation of Field .. ..   |   |
|   | That dairy cows do fairly well on it.   |

#### REPORT OF THE CONSULTING CHEMIST.

The Society's Consulting Chemist (Dr. Voelcker) reports upon the site as follows:—

Date of visit, June 10th, 1895.

Number of soils analysed. One.

There is a deficiency of lime and nitrogen, and the soil is comparatively poor in phosphoric acid.

There is no evidence of the presence of any ingredient likely to be deleterious to the growth of herbage.

The analysis of the soil is as follows:—

|  |              |
|--|--------------|
| *Organic matter and loss on heating .. | 3·98         |
| Oxide of iron .. ..                    | 2·61         |
| Alumina .. ..                          | 3·32         |
| Lime .. ..                             | ·33          |
| Magnesia .. ..                         | ·67          |
| Potash .. ..                           | ·45          |
| Soda .. ..                             | ·18          |
| Phosphoric acid .. ..                  | ·10          |
| Sulphuric acid .. ..                   | ·03          |
| Nitric acid .. ..                      | trace        |
| Insoluble silicates and sand .. ..     | 88·33        |
|  | <hr/> 100·00 |

\*Containing nitrogen .. .. .16

In consequence of the marked deficiency of lime, it will be well to lime one plot, say, with four tons of lime to the acre,

while, if basic slag be used on another plot, it will be seen if lime in this form does equally as well. The use of basic slag will further test whether the poverty of the soil in phosphoric acid can be made good in this way, or better by dissolved bones, which it is proposed to try on a third plot. Then there is a deficiency of nitrogen, and, to some extent, of organic matter also. By using, in one case dung, and, in another, dissolved bones, the comparative utility of the two different kinds of manure (both of them, however, nitrogen-supplying) can be shown. There is no deficiency of potash, and hence no need for specially trying potash manures.

As the Consulting Botanist advises the trial of re-seeding, it would be well to renovate a strip across each differently-manured plot, and thus to see at the same time what influence the manures have on the new pasture.

#### REPORT OF THE CONSULTING BOTANIST.

The Society's Consulting Botanist (Mr. Carruthers) reports upon the field as follows:—

Date of visit, July 23rd, 1895.

The soil consists of 6 in. or so of loam resting on clay.

The portion selected for the experimental area fairly represents the rest of the field, and the hurdled portion fairly represents the experimental area. The different species constituting the vegetation of the hurdled portion, and their relative proportions, are as follows:—

##### *Grasses.*

|                      |    |    |    |                    |
|----------------------|----|----|----|--------------------|
| Brome-grass          | .. | .. | .. | In small quantity. |
| Dog's-tail           | .. | .. | .. | In small quantity. |
| Fescue (Hard)        | .. | .. | .. | Very abundant.     |
| Rye-grass            | .. | .. | .. | Abundant.          |
| Timothy              | .. | .. | .. | In small quantity. |
| Twitch or Bent-grass | .. | .. | .. | Very abundant.     |
| Vernal (Sweet)       | .. | .. | .. | In plenty.         |
| Yorkshire Fog        | .. | .. | .. | Abundant.          |

##### *Clovers and other Leguminous Plants.*

|                 |    |    |    |           |
|-----------------|----|----|----|-----------|
| Clover (Alsike) | .. | .. | .. | Abundant. |
| Clover (Red)    | .. | .. | .. | Abundant. |
| Clover (White)  | .. | .. | .. | Abundant. |

##### *All other Plants.*

|           |    |    |    |               |
|-----------|----|----|----|---------------|
| Buttercup | .. | .. | .. | Abundant.     |
| Cat's-ear | .. | .. | .. | Abundant.     |
| Dock      | .. | .. | .. | Single plant. |
| Feverfew  | .. | .. | .. | Single plant. |
| Ox-eye    | .. | .. | .. | Plentiful.    |
| Ribwort   | .. | .. | .. | Abundant.     |
| Thistle   | .. | .. | .. | Single plant. |

This field in regard to the amount of food produced I should classify as poor.

About eight years ago the field was laid down with a mixture of red, white, and alsike Clovers and Italian and perennial Rye-grass for a one or two years ley.

The Italian Rye-grass early disappeared, and the herbage now consists of other plants which have grown from the blown seeds that have reached the field. Now the principal grasses are Twitch and Hard Fescue, then follow Dog's-tail and Yorkshire Fog, and in smaller quantities Brome-grass and Sweet Vernal Grass. Many weeds have accompanied them, like Cat's-ear, Ox-eye, Buttercup, Ribwort, &c. The deeper-rooted plants were growing most vigorously, being able to obtain water from the clay subsoil.

#### REPORT OF THE BOTANICAL VISITOR.

The Society's Botanical Visitor (Mr. F. J. Rowbotham) reports as follows:—

Date of visit, June 13th, 1895.

The site at Ottery St. Mary, Devon, affords a good example of the kind of permanent pasture land upon which it is the desire of the Society and its advisers to effect some improvement. It is a sample of the poorer class of land to be met with in the district, and the name of "Sicklands" given to this particular field indicates its character from the farmer's point of view.

This pasture, of about 11 acres, has been down about eight years, being originally sown with Red Clover (*Trifolium pratense*), Dutch Clover (*T. repens*), Alsike (*T. hybridum*), Perennial Rye-grass (*Lolium perenne*), and Italian Rye-grass (*L. Italicum*). No other clovers or grasses have since been introduced, and the field has been allowed to develop itself.

The top-soil is loam, six or seven inches in depth, resting upon a subsoil of clay. The herbage is liable to burn during a dry season. The field, which is artificially drained, has a slope to the north-east, and the upper portion is stated to be slightly wet. The slope, combined with the shallow depth at which the clay subsoil is reached, ensures a very rapid drainage, and the occupier states that during heavy rains manure is apt to be removed at a very rapid rate from the top-soil. The crop was fed off in 1893, and was mown last year.

It may be noted, with respect to the sowing of Italian Rye-grass, that the pasture was not originally intended

to be permanent. This grass has apparently completely appeared.

The following is a list of the grasses, clovers, and plants met with in the hurdled portion, together with relative proportions:—

| (a) Grasses.  | Relative Proportion       |
|---|---------------------------|
| Brome, Soft ( <i>Bromus mollis</i> ) .. ..                  | Scarce (abundant in open) |
| Cocksfoot ( <i>Dactylis glomerata</i> ) .. ..               | Scarce.                   |
| Dog's-tail, Crested ( <i>Cynosurus cristatus</i> ) .. ..    | Abundant.                 |
| Fescue, Hard ( <i>Festuca duriuscula</i> ) .. ..            | Scarce.                   |
| Meadow-grass, Smooth-stalked ( <i>Poa pratensis</i> ) .. .. | Rather scarce.            |
| Rye-grass, Perennial ( <i>Lolium perenne</i> ) .. ..        | Plentiful.                |
| Timothy, or Cat's-tail ( <i>Phleum pratense</i> ) .. ..     | Scarce; diminutive.       |
| Twitch or Bent ( <i>Agrostis vulgaris</i> ) .. ..           | Plentiful (not in flower) |
| Vernal, Sweet ( <i>Anthoxanthum odoratum</i> ) .. ..        | Not plentiful; in patches |
| Yorkshire Fog ( <i>Holcus lanatus</i> ) .. ..               | Abundant.                 |
| (b) Clovers and other Leguminous Plants.                    |                           |
| Clover, Red ( <i>Trifolium pratense</i> ) .. ..             | Not plentiful.            |
| Clover, White or Dutch ( <i>Trifolium repens</i> ) .. ..    | Plentiful.                |
| Yellow Suckling ( <i>Trifolium minus</i> ) .. ..            | Plentiful.                |
| (c) All other Plants.                                       |                           |
| Buttercup, Creeping ( <i>Ranunculus repens</i> ) .. ..      | Plentiful.                |
| Cat's-ear ( <i>Hypochaeris radicata</i> ) .. ..             | Plentiful.                |
| Chickweed, Mouse-ear ( <i>Cerastium triviale</i> ) .. ..    |                           |
| Cudweed ( <i>Gnaphalium sylvaticum</i> ) .. ..              | Scarce.                   |
| Daisy, Common ( <i>Bellis perennis</i> ) .. ..              |                           |
| Daisy, Ox-eye ( <i>Chrysanthemum Leucanthemum</i> ) .. ..   | Abundant.                 |
| Dandelion ( <i>Taraxacum officinale</i> ) .. ..             |                           |
| Ribwort ( <i>Plantago lanceolata</i> ) .. ..                | Plentiful.                |
| Rush, Soft ( <i>Juncus effusus</i> ) .. ..                  | Scarce.                   |
| Sorrel ( <i>Rumex acetosa</i> ) .. ..                       | Scarce.                   |
| Thistle, Creeping Plume ( <i>Cnicus arvensis</i> ) .. ..    | Scarce.                   |
| Woodrush, Field ( <i>Luzula campestris</i> ) .. ..          | Scarce.                   |

The herbage is very thin, and decidedly patchy. Here, especially in the lower portions of the field, thick patches of soft Brome-grass occur. In other parts Yorkshire Fog is quickly spread. Three grasses—Perennial Rye, locally called “Devon Ever,” Yorkshire Fog, and Crested Dog's-tail—more especially the two last-named—may be said to form the main gramineous herbage over the entire area. The proportionate number of the grasses found in the hurdled portion is greatly when compared with other portions of the field herbage, as I have remarked, being very patchy.

The abundance of Crested Dog's-tail is most marked, its culms shooting up on all sides. But there are several g



of which the scarcity or total absence deserve notice. Timothy-grass hardly occurs at all, and the few plants I found were dwarfed. Yellow Oat-grass (*Avena flavescens*) is not present, but perhaps the most notable absentee is Meadow Foxtail (*Alopecurus pratensis*). I would suggest that the scarcity of Timothy, combined with its stunted growth, would seem to indicate that the soil is unsuited to the support of this grass.

The Rough Cocksfoot in this field attracts attention. In the hurdled portion I found only one or two plants, and it is very sparingly distributed over the field; but it abounds at the borders beneath the trees, where it attains a height of about 3 feet. It would seem, however, to have an insuperable objection to advancing further into the open. In shaded spots this grass is associated with Meadow-grass, which in like manner diminishes when traced away from the borders.

The patchiness of the herbage alluded to above catches the eye from the coarse growth showing conspicuously. Sweet Vernal-grass, though generally distributed, grows mostly in patches, as likewise to a great extent does Hard Fescue. The short bottom growth consists chiefly of Fiorin. Perennial Rye-grass is abundant, but the leafage is scanty in this and other of the better grasses. The entire field, indeed, wears a starved hungry appearance. The soil is parched and deeply fissured, and much bare ground is visible.

Outside the hurdled portion a few other weeds occur, namely, Bird's-foot Trefoil (*Lotus corniculatus*), Yarrow (*Achillea Millefolium*), and Black-knapweed (*Centaurea nigra*). Thistle only abounds in the lower borders of the field.

The meadow stands rather high, amid undulating country. Adjoining the left top corner of the field is a coppice in which I am informed there rises a deep-seated spring, from which supplies are obtained for the district.

Dairy cows are stated to have done fairly well on the pasture; the feeding stuff used being corn.

The occupier states that the crop obtained last year was far in excess of that of the present season, to the dryness of which, doubtless, the paucity of bottom growth is largely due.

When the field was revisited in September last it had put on a new face. The rains which had occurred in the interim had brought on the growth of *Agrostis* to such an extent that the ground appeared quite full of bottom, and this, too, of very tender character. According to the occupier, who is, I may state, prepared to co-operate most heartily with the Society in its work, this field, in common with the rest of the grass land

on the farm, must be judged entirely by the season. Thus, in the spring or early summer the *grass* is seen at its worst, but as the fall draws on it gradually improves, and about the first week in September is at its best. In other words, the latter *math* is decidedly fuller than the spring growth, though this does not affect the height of the grass so much as it affects the development of the lower leaves or bottom growth. The amount, if not the quality, of feed is thus lessened or increased by dry or wet seasons.

**RECOMMENDATIONS AS TO TREATMENT GIVEN BY THE SOCIETY'S  
STEWARDS AND CONSULTING OFFICIALS.**

Sicklands Field. An area of 5 acres is here available, to be treated thus:—

|  |                             |                                 |                           |                                      |          |          |
|--|-----------------------------|---------------------------------|---------------------------|--------------------------------------|----------|----------|
| to be renovated<br>in Spring, 1896,<br>as per Mr. Car-<br>ruthers' sugges-<br>tions. |                             |                                 |                           |                                      |          | 1<br>cut |
|  | Dung.<br>15 loads per acre. | Basic Slag.<br>8 cwt. per acre. | Lime.<br>4 tons per acre. | Dissolved Bones.<br>4 cwt. per acre. | Nothing. |          |
|  | 5 Plots—1 acre each.        |                                 |                           |                                      |          |          |

Dung  
Basic Slag } to be applied in winter over whole Plot.  
Lime  
Dissolved Bones to be applied in spring over whole Plot just previous  
to re-seeding.

The cost of the artificial manurings would be, approximately:

|                         |                |
|-------------------------|----------------|
| Basic slag plot .. .. . | 20s. per acre. |
| Dissolved bones .. .. . | 25s. " "       |

The plot to be resown should be harrowed and cross-harrowed until about a quarter of the surface is exposed. The material dragged off should be burned. The seeds should be sown soon as the frosts are over, and the plot thereafter brush-chain-harrowed, so as to shake off the seeds from the herb into the spaces opened by the harrows. It would be well :

to roll it. The seeds used should be at the following rate per acre:—

|                          |      |                 |          |                  |                |
|--------------------------|------|-----------------|----------|------------------|----------------|
| 1 lb. Foxtail            | cost | 1s. 4d.         | contains | 410,000          | growing seeds. |
| 6 lbs. Cocksfoot         | „    | 5s. 6d.         | „        | 2,420,000        | „ „            |
| 4 lbs. Timothy           | „    | 2s. 0d.         | „        | 5,100,000        | „ „            |
| $\frac{1}{2}$ lb. Yarrow | „    | 1s. 8d.         | „        | 1,580,000        | „ „            |
| Total cost ..            |      | <u>10s. 6d.</u> | Total    | <u>9,510,000</u> | „ „            |

EXPERIMENTAL SITE NO. 2 AT KILLERTON, DEVON.

Owned by The Right Hon. Sir T. D. Acland, Bart., and occupied by Mr. Lewis Tout, of Broadclyst, Devon, who furnishes the following particulars:—

|   |       |   |
|---|-------|---|
| Nearest railway station                         | .. .. | Broadclyst (L. & S. W.).                    |
| Distance from ditto                             | .. .. | About two miles.                            |
| Name of Field                                   | .. .. | Landhay.                                    |
| Area  | .. .. | 9 a., 3 r., 30 p.                           |
| Number on Ordnance Survey Map                   | .. .. | 1925.                                       |
| Thickness of top soil                           | .. .. | Two feet.                                   |
| Colour of ditto                                 | .. .. | Dark brown.                                 |
| Character of ditto                              | .. .. | Light loam.                                 |
| Thickness of sub-soil                           | .. .. | Under 2 feet; shovel went down freely.      |
| Colour of ditto                                 | .. .. | Light or yellowish.                         |
| Character of ditto                              | .. .. | Sand and a little gravel.                   |
| Average annual rainfall for the district        | .. .. | Thirty-three inches.                        |
| Nature of surrounding district                  | .. .. | Flat.                                       |
| Slope of field                                  | .. .. | Slightly southward.                         |
| Height above sea level                          | .. .. | Seventy-five feet.                          |
| Situation of cattle-yard                        | .. .. | Higher and south.                           |
| Drainage  | .. .. | None. Does not require it.                  |
| Nature of grass                                 | .. .. | Much alike in quality throughout.           |
| Length of time known to have been down to grass | .. .. | Twenty years.                               |
| When sown                                       | .. .. | Thought to have been in spring with barley. |
| Grass seeds sown                                | .. .. | Usual permanent seeds for a light loam.     |
| Cost of ditto                                   | .. .. | About 32s. 6d.                              |
| When mown or grazed                             | .. .. | Usually grazed.                             |
| Tendency of herbage                             | .. .. | To scorch.                                  |
| When manured                                    | .. .. | Probably not for twenty years.              |
| Feeding stuffs used                             | .. .. | A few oats during lambing season.           |
| Head of Stock field is reckoned to carry        | .. .. | Four bullocks and ten sheep.                |
| Reputation of Field                             | .. .. | Not one on which dairy cows will do well.   |
| Chief fault of Field                            | .. .. | Want of "condition."                        |

**REPORT OF THE CONSULTING CHEMIST.**

The Society's Consulting Chemist (Dr. Voelcker) reports upon the soil as follows :—

The soil is a red sandy loam of light character and very uniform throughout the first foot depth. On analysis it gave the following results :—

|  |        |
|--|--------|
| *Organic matter and loss on heating .. | 3·05   |
| Oxide of iron .. .. .                  | 2·28   |
| Alumina .. .. .                        | 1·83   |
| Lime .. .. .                           | ·23    |
| Magnesia .. .. .                       | ·47    |
| Potash .. .. .                         | ·31    |
| Soda .. .. .                           | ·07    |
| Phosphoric acid .. .. .                | ·12    |
| Sulphuric acid .. .. .                 | ·04    |
| Insoluble silicates and sand .. .. .   | 91·60  |
|  | <hr/>  |
|  | 100·00 |
| *Containing nitrogen .. .. .           | ·15    |

From these results it would appear that the soil is poor in organic matter and nitrogen ; that it has only moderate amounts of phosphoric acid and potash, and is clearly deficient in lime. Liming ought accordingly to be tried, and organic matter and nitrogen supplied by dung or by bones in some form. The only moderate amount of phosphoric acid is a reason for trying basic slag or else bones, while, as there is not much potash, it would be well to try kainit also.

**REPORT OF THE CONSULTING BOTANIST.**

The Consulting Botanist of the Society (Mr. Carruthers) reports upon the field as follows :—

This field was visited on July 23rd, 1895. The portion selected for the experimental area fairly represents the rest of the field, and the hurdled portion fairly represents the experimental area. The vegetation of the hurdled portion is constituted of the following different species :—

*Grasses.*

|                               |                 |
|-------------------------------|-----------------|
| Dog's tail .. .. .            | Plentiful.      |
| Fescue (Hard) .. .. .         | Plentiful.      |
| Meadow-grass .. .. .          | Less plentiful. |
| Cyte-grass .. .. .            | Plentiful.      |
| Twitch, or Bent-grass .. .. . | Very abundant.  |
| Perennial-grass .. .. .       | Less plentiful. |
| Washire Hog .. .. .           | Plentiful.      |

*Clovers and other Leguminous Plants.*

|                |    |    |    |    |              |
|----------------|----|----|----|----|--------------|
| Clover (Red)   | .. | .. | .. | .. | Some plants. |
| Clover (White) | .. | .. | .. | .. | Abundant.    |

*All other Plants.*

|           |    |    |    |    |           |
|-----------|----|----|----|----|-----------|
| Buttercup | .. | .. | .. | .. | Not many. |
| Daisy     | .. | .. | .. | .. | Not many. |
| Thistle   | .. | .. | .. | .. | Not many. |
| Yarrow    | .. | .. | .. | .. | Not many. |

The field has a compact turf consisting mainly of Twitch (*Agrostis vulgaris*), with considerable quantities of Yorkshire Fog, Dog's-tail, Hard Fescue, Rye-grass, and Smooth-stalked Meadow-grass. White Clover fairly abounds, and there is some Red Clover. The pasture consists chiefly of what may be ranked as second-class grasses, but they form a good turf, and it would be difficult to get any seeds through it to the soil. I should classify the field, in regard to the amount of food produced, as good.

## REPORT OF THE BOTANICAL VISITOR.

The Society's Botanical Visitor (Mr. F. J. Rowbotham) reports as follows:—

Date of visit, June 14th, 1895.

This site has been selected as typical of the poor loam soils situate upon the New Red Sandstone formation.

The pasture has been down about twenty years. The soil exhibits no change of character at 12 inches, and I am informed that water finds its way to this depth after a few hours' rain. The field has a gentle slope to the south-east.

The following is a list of the grasses, clovers, and other plants met with in the hurdled portion, together with their relative proportions:—

(a) *Grasses.**Relative Proportions.*

|   |                   |
|---|-------------------|
| Dog's-tail, Crested ( <i>Cynosurus cristatus</i> ).           | Abundant.         |
| Fescue, Hard ( <i>Festuca duriuscula</i> ) ..                 | Fairly plentiful. |
| Foxtail, Meadow ( <i>Alopecurus pratensis</i> )               | Scarce.           |
| Meadow-grass, Smooth-stalked ( <i>Poa pratensis</i> ) .. .. . | Fairly plentiful. |
| Oat-grass, Yellow ( <i>Avena flavescens</i> ) ..              | Not plentiful.    |
| Rye-grass, Perennial ( <i>Lolium perenne</i> ) ..             | Fairly plentiful. |
| Twitch or Bent ( <i>Agrostis vulgaris</i> ) ..                | Plentiful.        |
| Vernal-grass, Sweet ( <i>Anthoxanthum odoratum</i> ) .. .. .  | Very scarce.      |
| Yorkshire Fog ( <i>Holcus lanatus</i> ) .. ..                 | Plentiful.        |

(b) *Clovers and other Leguminous Plants.*

|   |                |
|---|----------------|
| Clover, Dutch ( <i>Trifolium repens</i> ) .. .. | Plentiful.     |
| Clover, Red ( <i>Trifolium pratense</i> ) .. .. | Not plentiful. |

| (c) All other Plants.                              | Relative Proportions. |
|--|-----------------------|
| Buttercup, Creeping ( <i>Ranunculus repens</i> )   | Few.                  |
| Cat's-ear ( <i>Hypochaeris radicata</i> ) .. ..    |                       |
| Chickweed, Mouse-ear ( <i>Cerastium triviale</i> ) |                       |
| Daisy, Common ( <i>Bellis perennis</i> ) .. ..     |                       |
| Dandelion ( <i>Taraxacum officinale</i> ) .. ..    |                       |
| Moss .. ..   |                       |
| Ribwort ( <i>Plantago lanceolata</i> ) .. ..       | Not plentiful.        |
| Thistle, Creeping Plume ( <i>Cnicus arvensis</i> ) | Scarce.               |
| Wood-rush, Field ( <i>Luzula campestris</i> ) ..   | Scarce.               |
| Yarrow ( <i>Achillea Millefolium</i> ) .. ..       | A little.             |

A good deal of difference is observable between the upper and lower portions of the field. In the lower portion there is much tender bottom growth visible, comprising Twitch, Hard Fescue, &c., the soil being damper. As the upper portion of the field is approached the tender grass disappears, there is less depth of herbage, with frequent patches of bare soil.

The grass has been closely eaten. I am informed that the occupier turns in stock as soon as the herbage reaches the height of a few inches, and the result of this constant depasturing is seen, I think, in the tender growth to which I have referred. Within the hurdled portion the young grass has made a good start—a fact at once appreciated by the stock, which have cropped the tender herbage by reaching over the hurdles.

This is by no means a "buttercup field," and the absence of *Ranunculus* and other weeds, may, I suggest, be the result of the constant depasturage to which the field is subjected. Thistles, though present in considerable quantity, are chiefly confined to the higher portion and sides of the field. The fact that in the upper portion many bare patches of soil are visible, points to the conclusion that the battle of life is by no means keen over this pasture.

The experimental area fairly represents the rest of the field, allowance being made for the differences to which I have referred; and the hurdled portion may be regarded as a fair sample of the experimental area.

The exclusion of Cocksfoot (*Dactylis glomerata*) from the hurdled portion is accidental, as the grass occurs, though not plentifully, in other parts of the field. Timothy (*Phleum pratense*) is quite absent. Foxtail is only sparingly present, and the plants are not large. Yellow Oat-grass only occurs in small quantities. Dutch Clover, though abundant, is of meagre growth. Red Clover is everywhere scarce. The Field Wood-rush is only occasionally seen, and the Common Rush (*Juncus*) is only absent. *Ranunculus acris* occurs in the open, with

*Lotus corniculatus*. Moss is very general in the lower portion of the field.

Owing to the constant depasturage the grasses on this site do not seem to have been afforded a fair chance of attaining maturity. The most abundant grass is Crested Dog's-tail, the wiry culms of which are eschewed by stock, and which is therefore enabled to bring seed to perfection. On the occasion of a later inspection (in September last) opportunity was afforded of witnessing the productive power of the field during a single season, and that such an exceptionally dry one as the last. It was surprising to see what an excellent feed of tender herbage had been produced within the hurdled portion as the result of freedom of growth.

# RECOMMENDATIONS AS TO TREATMENT GIVEN BY THE SOCIETY'S CONSULTING OFFICIALS.

Landhay Field. An area of 6 acres to be taken, and treated thus :—

Strip of 25 yards wide along the top of each plot to be re-seeded as recommended.

|                           |                                 |   |          |                                     |                             |
|---------------------------|---------------------------------|---|----------|-------------------------------------|-----------------------------|
| Lime.<br>4 tons per acre. | Basic Slag.<br>8 cwt. per acre. | Basic Slag 6 cwt.<br>and Kainit 3 cwt.<br>per Acre. | Nothing. | Rare Bone-meal.<br>4 cwt. per acre. | Dung.<br>15 loads per acre. |
|---------------------------|---------------------------------|---|----------|-------------------------------------|-----------------------------|

6 Plots—1 acre each.

The manures to be all applied in winter.

The cost of the artificial manurings would be, about :—

|                                    |                |
|------------------------------------|----------------|
| Basic slag plot .. .. .            | 20s. per acre. |
| Basic slag and kainit plot .. .. . | 22s. " "       |
| Bone-meal plot .. .. .             | 22s. " "       |

Two broad bands about twenty-five yards wide to be taken across the field, and the seeds of Cocksfoot and Timothy to be applied to them at the rate of 6 lbs. of Cocksfoot and 4 lbs. of Timothy per acre. It would be well if one of the bands were harrowed so as to open to some extent the surface for the

reception of the seed, the other being left unprepared. The seeds should be sown as soon as the frosts are over. After sowing, the bands should be brush- or chain-harrowed, so as to shake off the seeds from the herbage and to bring them near to the soil.

#### EXPERIMENTAL SITE NO. 3, AT WANSTROW, SOMERSET.

Owned by W. Hurle Clarke, Esq., and occupied by Mr. Richard H. Yeoman, who furnishes the following particulars:—

|  |       |   |
|--|-------|---|
| Nearest railway station                            | .. .. | Wanstrow (G. W. R.).  |
| Distance from ditto                                | .. .. | Half a mile.  |
| Name of Field                                      | .. .. | Stall Ground.   |
| Area   | .. .. | Twenty-three acres.   |
| Number on Ordnance Survey Map                      | .. .. | 207.  |
| Geological strata                                  | .. .. | Oxford clay.  |
| Thickness of top-soil                              | .. .. | Four inches.  |
| Colour of ditto                                    | .. .. | Brown.  |
| Character of ditto                                 | .. .. | Sandy.  |
| Character of sub-soil                              | .. .. | Clay.   |
| Nature of surrounding district                     | .. .. | Undulating.   |
| Slope of Field                                     | .. .. | Southerly.  |
| Height above sea-level                             | .. .. | About five hundred feet.  |
| Situation of cattle-yard                           | .. .. | Quarter of a mile off on higher ground.   |
| Drainage   | .. .. | Fairly good.  |
| Nature of grass                                    | .. .. | { Much alike in quality throughout,<br>except on five acres, where it is<br>better than the rest. |
| Length of time known to have<br>been down to grass | .. .. | { Over eighty years.  |
| When mown or grazed                                | .. .. | Mown in 1894.   |
| Average hay crop                                   | .. .. | 15 cwt. per acre.   |
| Tendency of herbage                                | .. .. | Fairly green.   |
| When manured                                       | .. .. | Every year in the case of a few acres.  |
| Description of manures                             | .. .. | Compost.  |
| Description of Field                               | .. .. | { Not so "milky" in the quality of its<br>herbage as adjoining land.                              |

#### REPORT OF THE CONSULTING CHEMIST.

The Society's Consulting Chemist (Dr. Voelcker) reports upon the site as follows:—

Date of visit, June 10th, 1895.

Number of soils analysed. One.

There is a deficiency of phosphoric acid, and the soil is not rich in nitrogen, nor is there more than a sufficiency of lime.

There is no evidence of the presence of any ingredient likely to be deleterious to the growth of herbage.



The analysis of the soil is as follows :—

|  |        |
|--|--------|
| *Organic matter and loss on heating .. | 7·26   |
| Oxide of iron .. .. .                  | 3·75   |
| Alumina .. .. .                        | 5·51   |
| Lime .. .. .                           | ·60    |
| Magnesia .. .. .                       | ·40    |
| Potash .. .. .                         | ·50    |
| Soda .. .. .                           | ·18    |
| Phosphoric acid .. .. .                | ·07    |
| Sulphuric acid .. .. .                 | trace  |
| Nitric acid .. .. .                    | trace  |
| Insoluble silicates and sand .. .. .   | 81·73  |
|  | <hr/>  |
|  | 100·00 |
|  | <hr/>  |
| *Containing nitrogen .. .. .           | ·23    |

There is more lime in this soil than in the preceding ones, though still no great quantity; therefore lime in smaller quantity, say, 2 tons per acre, might be tried. Phosphoric acid being deficient, it is well to apply it in the different forms of superphosphate, basic slag, and dissolved bones. The presence of acrid and coarse grasses is justification for the employment of salt, as also of lime; while, as nitrogen is to some extent needed, dung should be applied experimentally.

The re-seeding recommended by Mr. Carruthers should be done across the top of each plot, so as to see if the manures have any effect on the new pasture.

#### REPORT OF THE CONSULTING BOTANIST.

The Consulting Botanist of the Society (Mr. Carruthers) reports as follows :—

Date of visit, July 24th, 1895.

The portion selected for the experimental area fairly represents the rest of the field, and the hurdled portion fairly represents the experimental area. The vegetation of the hurdled portion is constituted of the following different species :—

#### Grasses.

|                            |                       |
|----------------------------|-----------------------|
| Dog's-tail .. .. .         | Very abundant.        |
| Fescue (Hard) .. .. .      | Plentiful.            |
| Hassock-grass .. .. .      | Three or four plants. |
| Oat-grass (Yellow) .. .. . | Abundant.             |
| Quaking-grass .. .. .      | Very abundant.        |
| Timothy .. .. .            | Abundant.             |
| Twitch .. .. .             | Plentiful.            |
| Vernal-grass .. .. .       | Plentiful.            |
| Yorkshire Fog .. .. .      | Plentiful.            |

*Clovers and other Leguminous Plants.*

|                |    |    |    |                   |
|----------------|----|----|----|-------------------|
| Clover (Red)   | .. | .. | .. | Fairly plentiful. |
| Clover (White) | .. | .. | .. | Plentiful.        |

*All other Plants.*

|                 |    |    |    |    |                  |
|-----------------|----|----|----|----|------------------|
| Buttercup       | .. | .. | .. | .. | Abundant.        |
| Carnation-grass | .. | .. | .. | .. | Fairly abundant. |
| Cat's-ear       | .. | .. | .. | .. | Abundant.        |
| Dandelion       | .. | .. | .. | .. | Several plants.  |
| Hard Head       | .. | .. | .. | .. | Several plants.  |
| Ox-eye          | .. | .. | .. | .. | Fairly abundant. |
| Thistle         | .. | .. | .. | .. | Several plants.  |
| Yellow Rattle   | .. | .. | .. | .. | Abundant.        |

This field, though on a gentle slope, is throughout damp needs draining. The presence, in considerable abundance such plants as Quaking-grass, Yellow Rattle, the acrid creeping Buttercups, Carnation-grass, Rush, and Wood-shows that draining is needed. The principal grasses in the are Twitch, Sweet Vernal-grass, Dog's-tail, Hard Fescue, Quagrass, and Yorkshire Fog. In lesser quantities there are species of Cocksfoot, Smooth-stalked Meadow-grass, and Yellow grass, and some scattered plants of Hassock-grass. White C is fairly abundant, and there is also a good deal of Red C. There is a large proportion of worthless weeds in the field should classify the field, in regard to the amount of food produced as poor.

**REPORT OF THE BOTANICAL VISITOR.**

The Society's Botanical Visitor (Mr. F. J. Rowbot reports as follows:—

Date of visit, June 17th, 1895.

This pasture, comprising about 23 acres, has been beyond the memory of man. The top-soil, which is sand about four inches in depth, rests upon Oxford clay, and character of the field is stated to be slightly damp. It artificially drained about twenty-five years ago. The slopes gently to the south.

Mr. Knollys reports that:—"The field has been treated the ordinary way, and has been more frequently mown grazed, and dressed once in three or four years with a mixture of farmyard manure, road-scrappings, &c., the stock fed up being dairy cows. In 1894 the field was mown, and in 1895 was fed. . . The surrounding district is nearly all pasture. I gathered that there was a large area of grass land of a similar description to this field in the neighbourhood."

The following is a list of the grasses, clovers, and plants met with in the hurdled portion, together with their proportions:—

| (a) Grasses.  | Relative Proportions.    |
|---|--------------------------|
| Cocksfoot ( <i>Dactylis glomerata</i> ) .. ..                   | Scarce; very small.      |
| Couch ( <i>Agropyrum repens</i> ) .. ..                         | Very scarce.             |
| Dog's-tail, Crested ( <i>Cynosurus cristatus</i> )              | Abundant.                |
| Fescue, Hard ( <i>Festuca duriuscula</i> ) ..                   | Plentiful.               |
| Fescue, Tall ( <i>Festuca elatior</i> ) .. ..                   | Scarce.                  |
| Foxtail, Meadow ( <i>Alopecurus pratensis</i> )                 | Scarce.                  |
| Hassock-grass ( <i>Deschampsia cespitosa</i> )                  | Scarce.                  |
| Meadow-grass, Smoothed-stalked ( <i>Poa pratensis</i> ) .. ..   | Not plentiful.           |
| Oat-grass, Yellow ( <i>Avena flavescens</i> ) ..                | A sprinkling.            |
| Quaking-grass ( <i>Briza media</i> ) .. ..                      | Abundant.                |
| Rye-grass, Perennial ( <i>Lolium perenne</i> )                  | Scarce.                  |
| Timothy, Cat's-tail ( <i>Phleum pratense</i> )..                | Frequent; not in flower. |
| Twitch or Bent ( <i>Agrostis vulgaris</i> ) ..                  | Plentiful.               |
| Vernal-grass, Sweet ( <i>Anthoxanthum odoratum</i> ) .. ..      | Plentiful.               |
| Yorkshire Fog ( <i>Holcus lanatus</i> ) .. ..                   | Fairly plentiful.        |
| (b) Clovers and other Leguminous Plants.                        |                          |
| Clover, Red ( <i>Trifolium pratense</i> )... ..                 | Abundant.                |
| Clover, White or Dutch ( <i>Trifolium repens</i> )              | Scarce.                  |
| Meadow Vetchling ( <i>Lathyrus pratensis</i> )                  | Not plentiful.           |
| Trefoil, Bird's-foot ( <i>Lotus corniculatus</i> )              | Not plentiful.           |
| (c) All other Plants.   |                          |
| Bugle ( <i>Ajuga reptans</i> ) .. ..                            | Scarce.                  |
| Buttercup, Bulbous ( <i>Ranunculus bulbosa</i> )                | Very scarce.             |
| Buttercup, Creeping ( <i>Ranunculus repens</i> )                | Plentiful.               |
| Cat's-ear ( <i>Hypochaeris radicata</i> ) .. ..                 | Plentiful.               |
| Chickweed, Mouse-ear ( <i>Cerastium triviale</i> ) .. ..        | .. ..                    |
| Crowfoot, Meadow ( <i>Ranunculus acris</i> )..                  | Abundant.                |
| Daisy, Common ( <i>Bellis perennis</i> ).. ..                   | .. ..                    |
| Daisy, Ox-eye ( <i>Chrysanthemum Leucanthemum</i> ) .. ..       | Abundant.                |
| Dandelion ( <i>Taraxacum officinale</i> ) .. ..                 | .. ..                    |
| Fern, Adder's-tongue ( <i>Ophioglossum vulgatum</i> ) .. ..     | Rather scarce.           |
| Flax, Cathartic ( <i>Linum catharticum</i> ) ..                 | .. ..                    |
| Knapweed, Black ( <i>Centaurea nigra</i> ) ..                   | Not plentiful.           |
| Moss .. ..  | General.                 |
| Ragged Robin ( <i>Lychnis Flos-cuculi</i> ) ..                  | Scarce.                  |
| Rush, Field Wood ( <i>Luzula campestris</i> )                   | Plentiful.               |
| Rush, Jointed ( <i>Juncus articulatus</i> ) ..                  | Frequent.                |
| Sedge, Carnation ( <i>Carex panicea</i> ) .. ..                 | Abundant.                |
| Self-heal ( <i>Brunella vulgaris</i> ) .. ..                    | Scarce.                  |
| Sorrel, Common ( <i>Rumex acetosa</i> ).. ..                    | Plentiful.               |
| Speedwell, Thyme-leaved ( <i>Veronica serpyllifolia</i> ) .. .. | Very scarce.             |
| Thistle, Marsh Plume ( <i>Cnicus palustris</i> )                | Very scarce.             |
| Yarrow ( <i>Achillea Millefolium</i> ) .. ..                    | Not plentiful.           |
| Yellow-rattle ( <i>Rhinanthus Crista-galli</i> )                | Abundant.                |

The almost entire absence of Perennial Rye-grass within the hurdled portion is in striking contrast with its frequency in

other parts of the field. Timothy is only occasionally seen—several plants growing together. It is nowhere in flower, and the growth appears stunted. Tall Fescue is generally plentiful, though it does not attain a height of more than two feet. There is only a sprinkling of Foxtail, and the growth as now seen is exceedingly wiry, with meagre spikes. The same may be said of Cocksfoot, so far as the experimental area is concerned, over which, indeed, it appears to be even scarcer than Foxtail.

Smooth-stalked Meadow-grass is sparsely distributed, and the herbage is very scanty. Soft Brome-grass (*Bromus mollis*) chiefly affects the upper portions of the field, where it is met with in patches of limited extent. (It did not occur in the hurdled portion.) The Rush occurs plentifully, associated with Field Wood-rush and Carnation Sedge.

The vegetation is sparse in places, but taking the whole area into consideration, very little bare ground is visible. The great abundance of weeds—notably of the Ox-eye Daisy, Meadow Crowfoot, and Yellow Rattle—is a feature of special note. Ragged Robin is seen here and there, but is not general. Of the clovers, White Clover is sparingly present, while Red Clover is abundant. Marsh Plume Thistle is frequent.

Though Hassock-grass is fairly plentiful, it does not form very dense or raised tufts, such as occur in a grazing meadow below (stated to be of better quality), where the stock crop the harsh herbage to a certain extent.

Altogether the field is fairly even, excepting, of course, the borders and parts beneath the trees. In such situations Cocksfoot and Smooth-stalked Meadow-grass grow luxuriantly, and Hassock-grass disappears. The slight lumpiness of the surface is due chiefly to the normally wet nature of the soil and the treading of cattle, and only slightly, if at all, to the presence of Hassock-grass. Spotted Orchis (*Orchis maculata*) occurs frequently, and, near the borders of ditches, Horse-tail (*Equisetum arvense*). Taken altogether, the herbage comprises a fair sprinkling of good grasses with clovers. Couch is not prevalent, but, as already noticed, the Carnation Sedge is everywhere conspicuous. The soil is sandy and much fissured.

With regard to dairy reputation, the occupier states that this field is inferior to the adjoining land. The average hay crop has been about 15 cwts. per acre.

The separation of this field from that next below (to the south), so far as hedges are concerned, is only arbitrary; but when the vegetation of the two areas is compared, the separation is seen to be very real. The soil of the lower meadow is, I am informed, of a better description than that of the experimental field, and certainly appears to be wetter. Here Cocksfoot is

present in great abundance, growing to a height of 3 feet or over, associated with Perennial Rye-grass, Tall Fescue, and Yellow Oat-grass—all of which are of more luxuriant growth than in the upper meadow—the vegetation generally being denser and ranker. A small stream flows at the lower end of this field, which is in the track of cattle passing to the upper meadow. A like stream divides the upper meadow from the adjoining pastures.

At a later visit it was observed that the field had produced an abundance of good feed following upon the rains; a capital bottom, chiefly of *Agrostis*, being present, with an increase in the proportion of Dutch Clover. The abundance of weeds was, however, very marked—a patch of a foot square, selected haphazard, showed the proportion of weeds to grasses to be very large. The occupier stated that while the feed was unsuited to grown beasts, unless accompanied by cake, *young* stock did better here than on stronger ground.

It was interesting to observe that on a small patch on which silage had been placed last year, and around which cattle had congregated, a number of grasses had secured a footing, foremost among them being Cocksfoot and Tall Fescue, both of which were scarce in other parts of the field.

# RECOMMENDATIONS AS TO TREATMENT GIVEN BY THE SOCIETY'S STEWARDS AND CONSULTING OFFICIALS.

Wanstrow, Somerset. Stall Ground. 7 acres or more are here available, to be treated thus:—

|   |                                 |   |                                      |                             |                           |                           |          |
|---|---------------------------------|---|--------------------------------------|-----------------------------|---------------------------|---------------------------|----------|
| to be renovated in Spring, 1896, as per Mr. Caruthers' suggestions. | Basic Slag.<br>8 cwt. per acre. | Mineral Superphosphate.<br>4 cwt. per acre. | Dissolved Bones.<br>4 cwt. per acre. | Dung.<br>12 loads per acre. | Lime.<br>2 tons per acre. | Salt.<br>5 cwt. per acre. | Nothing. |
|   | 2                               |   |                                      |                             |                           |                           | 2        |
|   |                                 |   |                                      |                             |                           |                           |          |
|   |                                 |   |                                      |                             |                           |                           |          |
|   |                                 |   |                                      |                             |                           |                           |          |
|   |                                 |   |                                      |                             |                           |                           |          |
|   |                                 |   |                                      |                             |                           |                           |          |

7 Plots—1 acre each.

Basic Slag  
 Dung  
 Lime  
 Salt  
 Superphosphate  
 Dissolved Bones

} to be applied in winter over whole Plots.  
 } to be applied in Spring, shortly before re-seeding.

The approximate cost of the artificial manurings will be:—

|                         |                |
|-------------------------|----------------|
| Basic slag .. .. .      | 20s. per acre. |
| Superphosphate .. .. .  | 10s. " "       |
| Dissolved bones .. .. . | 25s. " "       |
| Salt .. .. .            | 10s. " "       |

The portion to be re-seeded should be harrowed and cross-harrowed till about a quarter of the surface is exposed. The materials dragged off should be burnt. As soon as the frosts are over the seeds should be sown, and the plot should then be brush- or chain-harrowed, so as to shake the seeds off the herbage into the spaces opened by the harrows. It would be well to roll it afterwards. The following seeds should be used per acre:—

|                   |              |                 |            |                   |                |
|-------------------|--------------|-----------------|------------|-------------------|----------------|
| 1 lb.             | Foxtail      | cost 1s. 4d.    | containing | 410,000           | growing seeds. |
| 6 lbs.            | Cocksfoot    | " 5s. 6d.       | "          | 2,420,000         | " "            |
| 4 lbs.            | Timothy      | " 2s. 0d.       | "          | 5,100,000         | " "            |
| 2 lbs.            | White Clover | " 2s. 6d.       | "          | 1,430,000         | " "            |
| $\frac{1}{2}$ lb. | Yarrow       | " 1s. 8d.       | "          | 1,580,000         | " "            |
| Total cost ..     |              | <u>13s. 0d.</u> | Total      | <u>10,940,000</u> | " "            |

#### EXPERIMENTAL SITE NO. 4, AT SHERBORNE, DORSET.

Owned by J. K. D. Wingfield Digby, Esq., M.P., and occupied by Mr. T. H. Miller, of Black Marsh Farm, Sherborne, who has supplied the following particulars:—

|   |                                   |
|---|-----------------------------------|
| Nearest railway station .. .. .                         | Sherborne (L. & S. W. R.).        |
| Distance from ditto .. .. .                             | About one and a half miles.       |
| Name of Field .. .. .                                   | Little Rowcroft.                  |
| Area .. .. .  | Seven acres nineteen perches.     |
| Number on Ordnance Survey Map ..                        | 533.                              |
| Thickness of top-soil .. .. .                           | Ten inches.                       |
| Colour of ditto .. .. .                                 | Brown.                            |
| Character of ditto .. .. .                              | Light loam.                       |
| Thickness of sub-soil .. .. .                           | Four or five feet.                |
| Colour of ditto .. .. .                                 | Yellow.                           |
| Character of ditto .. .. .                              | Gravel.                           |
| Nature of surrounding district ..                       | Flat.                             |
| Nature of field .. .. .                                 | Fairly level.                     |
| Height above sea-level .. .. .                          | About 220 feet.                   |
| Situation of cattle-yard .. .. .                        | About half a mile from the field. |
| Drainage .. .. .  | Good.                             |
| Nature of grass .. .. .                                 | Much alike in quality.            |
| Length of time known to have been sown to grass .. .. . | Fifteen years.                    |
| When sown .. .. .                                       | In spring with corn crop.         |

*for the Improvement of Permanent Pasture.*

|  |                                    |
|--|------------------------------------|
| Description of grass seeds sown .. ..  | Sutton's Mixture for<br>loam soil. |
| Cost of ditto .. ..  | About 30s. per acre.               |
| Character of season when seeds were<br>sown .. ..                              | Good.                              |
| When usually mown .. ..  | About two years out of             |
| When last mown .. ..   | In 1894.                           |
| Average hay crop .. ..   | About 18 cwt. per acre.            |
| Tendency of herbage .. ..  | To burn in a dry summer            |
| When road scrapings were applied ..  | In spring of 1895.                 |
| Feeding stuffs used during last five<br>years for the cattle grazing the field | Decorticated cake.                 |
| Number of cows Field is reckoned to<br>carry .. ..                             | About four.                        |
| Reputation of Field .. ..  | That dairy cows do well            |
| Description of ditto .. ..   | Herbage very thin and s            |

**REPORT OF THE CONSULTING CHEMIST.**

The Society's Consulting Chemist (Dr. Voelcker) reports upon the site as follows:—

Dates of visits, June 8th and November 15th, 1895.

Number of soils analysed. One.

The soil is rich rather than otherwise.

There is no evidence of the presence of any ingredient to be deleterious to the growth of herbage.

The analysis of the soil is as follows:—

|  |        |
|--|--------|
| *Organic matter and loss on heating .. | 14·48  |
| Oxide of iron .. ..                    | 6·74   |
| Alumina .. ..                          | 5·78   |
| Lime .. ..                             | 5·05   |
| Magnesia .. ..                         | ·80    |
| Potash .. ..                           | ·44    |
| Soda .. ..                             | ·25    |
| Phosphoric acid .. ..                  | ·35    |
| Sulphuric acid .. ..                   | ·09    |
| **Carbonic acid .. ..                  | 2·45   |
| Nitric acid .. ..                      | trace  |
| Insoluble silicates and sand .. ..     | 63·57  |
|  | <hr/>  |
|  | 100·00 |
|  | <hr/>  |
| *Containing nitrogen .. ..             | ·56    |
| **Equal to carbonate of lime .. ..     | 5·57   |

Here is a soil containing abundance of lime, and not showing clearly any deficiency of constituents of fertility. It may well be to try whether a cheap material like basic slag improves the pasture, and to compare its effect with that of a material used locally, viz., road-scrapings. But beyond this, and re-seeding of one plot, it is not proposed to go at present.

**REPORT OF THE CONSULTING BOTANIST.**

The Society's Consulting Botanist (Mr. Carruthers) reports upon the site as follows:—

Date of visit, July 22nd, 1895.

The portion selected for the experimental area fairly represents the rest of the field, and the hurdled portion fairly represents the experimental area. One side of the field has more moisture, and the vegetation is somewhat modified. The vegetation of the hurdled portion is constituted of the following different species:—

*Grasses.*

|                              |         |                |
|------------------------------|---------|----------------|
| Brome-grass                  | .. .. . | Some plants.   |
| Cocksfoot                    | .. .. . | Most abundant. |
| Dog's-tail                   | .. .. . | Some plants.   |
| Fescue (Hard)                | .. .. . | Abundant.      |
| Meadow-grass, Smooth-stalked | .. .. . | Abundant.      |
| Oat-grass, Yellow            | .. .. . | Plentiful.     |
| Rye-grass                    | .. .. . | Abundant.      |
| Timothy                      | .. .. . | Plentiful.     |

*Clovers and other Leguminous Plants.*

|                 |         |              |
|-----------------|---------|--------------|
| Clover (Alsike) | .. .. . | Some plants. |
| Clover (Red)    | .. .. . | Some plants. |
| Clover (White)  | .. .. . | Abundant.    |

*All other Plants.*

|                 |         |                |
|-----------------|---------|----------------|
| Carnation-grass | .. .. . | Abundant.      |
| Chickweed       | .. .. . | Abundant.      |
| Cow Parsnip     | .. .. . | Single plant.  |
| Dock            | .. .. . | Single plant.  |
| Hawk's-beard    | .. .. . | Abundant.      |
| Ox-eye          | .. .. . | Single plant.  |
| Primrose        | .. .. . | Single plant.  |
| Ribwort         | .. .. . | Very abundant. |

The pasture consists of good grasses and clovers, but all have a starved and stunted appearance. In dry seasons, as in this year, it is subject to burning. The ten inches of soil rest on four to six feet of gravel. The field slopes gently, and it has consequently a good natural drainage. About twelve years ago, however, the field was artificially drained and, in addition, a wide trench, reaching down some two feet into the gravel, has been carried along the bottom of the field and up one of the sides. Rain readily passes through the light surface soil into the gravel, and is at once carried off by the drains and the trench. A short spell of drought must tell upon the herbage. I should classify the field, in regard to the amount of food produced, as poor



## REPORT OF THE BOTANICAL VISITOR.

The Society's Botanical Visitor (Mr. F. J. Rowbotham) reports as follows :—

Date of visit, June 20th, 1895.

This pasture of about 7 acres has been down about fifteen years, when it was sown in spring with corn in a good season. A well-known seedsman's Mixture for medium loams was employed. No other seeds have since been sown.

The soil consists of about 10 inches of Oolitic "drift" from the hills, forming a light loam, resting upon a subsoil of gravel, 4 or 5 feet in depth, extending to the Oolite rock.

The field was drained ten or twelve years ago, and was dressed with road-scrappings in February and March of the present year. Owing to the dryness of the weather this application has produced no beneficial result.

The herbage has the reputation of burning during a dry summer, and the truth of this is borne out at the present time.

The following is a list of the grasses, clovers, and other plants met with in the hurdled portion, together with their relative proportions :—

| (a) Grasses.                                       |       | Relative Proportions. |
|--|-------|-----------------------|
| Brome, Soft ( <i>Bromus mollis</i> )               | .. .. | Scarce.               |
| Cocksfoot ( <i>Dactylis glomerata</i> )            | .. .. | Abundant.             |
| Dog's-tail, Crested ( <i>Cynosurus cristatus</i> ) | .. .. | Very little.          |
| Fescue, Hard ( <i>Festuca duriuscula</i> )         | .. .. | Plentiful.            |
| Meadow-grass, Smooth ( <i>Poa pratensis</i> )      | .. .. | Plentiful.            |
| Oat-grass, Tall ( <i>Avena elatior</i> )           | .. .. | One or two plants.    |
| Oat-grass, Yellow ( <i>Avena flavescens</i> )      | .. .. | Plentiful.            |
| Rye-grass, Perennial ( <i>Lolium perenne</i> )     | .. .. | Plentiful.            |
| Timothy, Cat's-tail ( <i>Phleum pratense</i> )     | .. .. | Plentiful.            |
| Yorkshire Fog ( <i>Holcus lanatus</i> )            | .. .. | Very little.          |

## (b) Clovers and other Leguminous Plants.

|  |       |              |
|--|-------|--------------|
| Clover, Red ( <i>Trifolium pratense</i> )          | .. .. | Not much.    |
| Clover, White ( <i>Trifolium repens</i> )          | .. .. | Abundant.    |
| Medick, Black ( <i>Medicago lupulina</i> )         | .. .. | Very little. |
| Suckling, Yellow ( <i>Trifolium minus</i> )        | .. .. | Very little. |
| Trefoil, Bird's-foot ( <i>Lotus corniculatus</i> ) | .. .. | Not much.    |

## (c) All other Plants.

|   |       |            |
|---|-------|------------|
| Buttercup, Creeping ( <i>Ranunculus repens</i> )    | .. .. | Very few.  |
| Chickweed, Mouse-ear ( <i>Cerastium triviale</i> )  | .. .. | Plentiful. |
| Daisy, Common ( <i>Bellis perennis</i> )            | .. .. | Scarce.    |
| Daisy, Ox-eye ( <i>Chrysanthemum Leucanthemum</i> ) | .. .. | Few.*      |

(\*Plentiful elsewhere in the field.)

|  |            |
|--|------------|
| Hawk's-beard, Smooth ( <i>Crepis virens</i> )      | Abundant.  |
| Moss <i>sp.</i> .. .. .                            | General.   |
| Ribwort ( <i>Plantago lanceolata</i> ) .. ..       | Abundant.  |
| Sedge, Carnation ( <i>Carex panicea</i> ) ..       | Plentiful. |
| Self-heal ( <i>Brunella vulgaris</i> ) .. ..       | Scarce.    |
| Sorrel, Common ( <i>Rumex acetosa</i> ) .. ..      | Not much.  |
| Thistle, Creeping Plume ( <i>Cnicus arvensis</i> ) | One plant. |

The pasture is wretchedly thin and the herbage wiry. The hurdled portion fairly represents the rest of the experimental area, but the herbage within the hurdles has been much trodden by the men engaged in putting up the fence, and as this has only recently been done, the grasses have not had time to recover. The field is badly burnt, and in places the soil is almost bare.

Outside the hurdled portion the character of the herbage varies a good deal. Ribwort is everywhere abundant, and the most plentiful grass is Cocksfoot. Timothy is likewise plentiful, but, except in places, does not attain a large growth. Sweet Vernal-grass (*Anthoxanthum odoratum*) is almost entirely absent, and Foxtail (*Alopecurus pratensis*) only puts in an appearance here and there. (Neither of these two grasses occur in the hurdled portion.) Perennial Rye-grass is very plentiful. Hard Fescue varies, appearing in greatest quantity on the burnt-up portions of the field. Despite the wretched appearance of the herbage generally, it is a remarkable and no less interesting fact that the most abundant grasses are without exception of good quality. Tall Oat-grass is found in considerable quantity near the borders, but elsewhere it is only occasionally seen. Crested Dog's-tail is variable, being most plentiful east of the hurdled portion.

The field is fairly level. At the western extremity the soil being fed by springs is moister. As this portion of the field is approached a distinct change in the character of the herbage is apparent. The growth is ranker. Field Bindweed (*Convolvulus arvensis*) appears, with Horsetail (*Equisetum*). Smooth-stalked Meadow-grass also increases largely. Timothy attains a finer growth, a specimen from this spot measuring 3 feet 6 inches, with a spike 5 inches in length. Hard Fescue diminishes, while Yorkshire Fog increases. Cocksfoot, however, maintains its place. It is noticeable, too, that the sedge dwindles down—its relative proportions varying in different portions of the field. Soft Brome-grass is nowhere obtrusively present. Buttercup increases towards the western end of the field.

A considerable difference is observable in the herbage between the portions of the field east and west of the hurdled portion. Eastward Timothy decreases in numbers,

while there is a corresponding increase of Dog's-tail. At the eastern end of the field the surface rises gradually on a clay soil. Buttercup is more frequently observed with patches of Yellow Oat-grass. Red Clover also becomes more frequent. Here and there Quaking-grass (*Briza media*) is seen, with Black Knapweed (*Centaurea nigra*) and Yellow Bedstraw (*Galium verum*). Yarrow (*Achillea millefolium*) is scarce here as elsewhere in the field. There are patches almost bare of grass occupied by Red and White Clovers and weeds. Yorkshire Fog is more plentiful again at this end of the field. Twitch (*Agrostis vulgaris*) does not appear, and sedge is only occasionally noted.

Although the soil supports some good grasses, the herbage generally is very poor. I suggest that the field may possibly be overdrained. The evidence of the field having been seeded down with a good mixture is not wanting, though doubtless some of the grasses have degenerated, while others may have entirely disappeared. Under existing circumstances the soil does not appear to be capable of supporting a heavy gramineous herbage, as evidenced by the thinness everywhere apparent, and the sparse leafage. The soil, moreover, is in no sense fully occupied.

It should be observed that this particular field does not bear the purging character ("teart"), which is attributed to the herbage of certain lands in the vicinity.

The field is stated to bear a good reputation for dairy cows—the number it is reckoned to carry being about four. The feeding stuff used has been decorticated cotton-cake.

The field has been mown about two years in three, and it was mown last year. The average hay crop has been about 18 cwts. per acre.

An adjoining meadow—visited for the purpose of comparison—exhibits some material differences, notably in closeness of growth and abundance of leafage. This is a very old pasture, and stated to be of much better quality than that selected for experiment. The soil appears to be damper. I observed plenty of Yellow-rattle (*Rhinanthus Crista-galli*) here, though the plant is entirely absent in the experimental field.

When the site was revisited in September no improvement could be seen, though the occupier stated that a little time previously the herbage had made a better show; but it is very obvious that this pasture comes forward and "goes back" in accordance with the variations in the supply of moisture. Further, it is evident that water is not retained for a sufficient period in the soil.

**RECOMMENDATIONS AS TO TREATMENT GIVEN BY THE SOCIETY'S  
STEWARDS AND CONSULTING OFFICIALS.**

Little Rowcroft, Sherborne, Dorset. Four acres.

|                        |                 |   |   |
|------------------------|-----------------|---|---|
| <i>Road Scrapings.</i> | <i>Nothing.</i> | <i>Basic Slag.<br/>8 cwt. per acre.</i> | <i>To be re-seeded<br/>in Spring, 1896.</i> |
|------------------------|-----------------|---|---|

4 Plots—1 acre each.

Road-scrapings } to be applied in winter.  
Basic Slag }

The cost of manuring the basic slag plot will be about 20s. per acre.

A portion of the experimental field to be resown with the following seeds at the rate of—

|                                  |             |
|----------------------------------|-------------|
| 2 lbs. Meadow Fescue             | } per acre. |
| 1 lb. Rough Stalked Meadow-grass |             |
| 2 lbs. White Clover              |             |
| $\frac{1}{2}$ lb. Yarrow         |             |

To be sown as soon as the frosts are over and the plot to be rolled after sowing.

**EXPERIMENTAL SITE NO. 5, AT COWFOLD, SUSSEX.**

Owned by Rev. J. Goring, and occupied by Mr. John Reeve, of Champions, West Grinstead, Horsham, Sussex, who furnishes the following particulars :—

|   |       |  |
|---|-------|--|
| Nearest railway station                         | .. .. | West Grinstead (L. B. & S. C. R.).               |
| Distance from ditto                             | .. .. | One mile.  |
| Name of Field                                   | .. .. | Poor Field.                                      |
| Area  | .. .. | Ten acres.                                       |
| Number on Ordnance Survey map                   |       | 562.   |
| Thickness of top soil                           | .. .. | About four inches.                               |
| Colour of ditto                                 | .. .. | Rather light.                                    |
| Character of ditto                              | .. .. | Heavy and stiff.                                 |
| Colour of sub-soil                              | .. .. | Lighter than top-soil.                           |
| Character of ditto                              | .. .. | Very heavy.                                      |
| Nature of surrounding district                  | .. .. | Hilly.   |
| Nature of Field                                 | .. .. | { Fairly level, but slopes slightly north-wards. |
| Situation of cattle-yard                        | .. .. | Quarter of a mile off.                           |
| Drainage  | .. .. | Good.  |
| Nature of grass                                 | .. .. | Much alike in quality.                           |
| Length of time known to have been down to grass | .. .. | { Nine years.                                    |

|  |   |
|--|---|
| en sown .. .. .  | Spring, with cereal crop.                           |
| cription of grass seeds sown ..  | { Ordinary mixture ordinarily used in the district. |
| ow lbs. per acre of different sorts of clover seeds have been sown since.) |   |
| en last mown .. .. .   | In 1894.  |
| rage hay crop .. .. .  | About one ton per acre.                             |
| endency of herbage .. .. .   | Scorches rather.                                    |
| en manure last applied .. .. .   | In 1893.  |
| cription of ditto .. .. .  | Basic slag.   |
| ding stuffs used during last   |   |
| ve years for the cattle grazing }  | Cake and corn.                                      |
| he Field .. .. .   |   |
| ud of stock Field is reckoned to }   | Six or seven in a growing season.                   |
| arry .. .. .   |   |
| cription of Field .. .. .  | Inferior, the soil being naturally poor.            |

# REPORT OF THE CONSULTING CHEMIST.

ie Consulting Chemist of the Society (Dr. Voelcker) has  
ted upon the site as follows :—  
ite of visit, June 7th, 1895.

umber of soils analysed. One.

ie soil is poor in phosphoric acid, and especially so in  
gen. It is also rather deficient in vegetable matter, and  
t all rich in lime.

ere is no evidence of the presence of any ingredient likely  
deleterious to the growth of herbage, but the heavy nature  
a soil and its hard mechanical condition, especially in a dry  
n, are all against the soil elements becoming available and  
rasses flourishing.

e analysis of the soil is as follows :—

|  |        |
|--|--------|
| *Organic matter and loss on heating .. | 5·82   |
| Oxide of iron .. .. .                  | 5·16   |
| Alumina .. .. .                        | 7·40   |
| Lime .. .. .                           | ·57    |
| Magnesia .. .. .                       | ·40    |
| Potash .. .. .                         | ·70    |
| Soda .. .. .                           | ·22    |
| Phosphoric acid .. .. .                | ·10    |
| Sulphuric acid .. .. .                 | trace  |
| Nitric acid .. .. .                    | trace  |
| Insoluble silicates and sand .. .. .   | 79·63  |
|  | <hr/>  |
|  | 100·00 |

|                              |     |
|------------------------------|-----|
| *Containing nitrogen .. .. . | ·14 |
|------------------------------|-----|

e soil being poor in phosphoric acid, there is reason for  
g both basic slag and superphosphate; while, as regards  
ormer, it will be of interest to see whether one heavy  
ing or two at intervals will be the better. Dung is used

on account of the deficiency of nitrogen, while kainit and ~~sea~~ are tried in order to see if they check the spread of Bent-grass. Lime, in moderate amount, is applied with a similar object, and to improve the soil mechanically.

#### REPORT OF THE CONSULTING BOTANIST.

The Consulting Botanist of the Society (Mr. Carruthers) has reported upon the site as follows:—

Date of visit, July 29th, 1895.

The portion selected for the experimental area fairly represents the rest of the field, and the hurdled portion fairly represents the experimental area. The different species constituting the vegetation of the hurdled portion are as follows:—

##### *Grasses.*

|                      |    |    |    |    |    |                     |
|----------------------|----|----|----|----|----|---------------------|
| Cocksfoot            | .. | .. | .. | .. | .. | Abundant.           |
| Dog's-tail (Crested) | .. | .. | .. | .. | .. | Less abundant.      |
| Fescue (Hard)        | .. | .. | .. | .. | .. | Somewhat plentiful. |
| Meadow-grass         | .. | .. | .. | .. | .. | Somewhat plentiful. |
| Rye-grass            | .. | .. | .. | .. | .. | Abundant.           |
| Timothy              | .. | .. | .. | .. | .. | Abundant.           |
| Twitch or Bent-grass | .. | .. | .. | .. | .. | Abundant.           |
| Yorkshire Fog        | .. | .. | .. | .. | .. | Abundant.           |

##### *Clovers and other Leguminous Plants.*

|                |    |    |    |    |    |         |                   |
|----------------|----|----|----|----|----|---------|-------------------|
| Clover (Red)   | .. | .. | .. | .. | .. | Common. | Plenty in patches |
| Clover (White) | .. | .. | .. | .. | .. | Common. | Plenty in patches |

The plot is generally free from weeds.

The field has a thin clay soil resting on a clay sub-soil. The field was laid down by a former tenant about nine years ago. No information as to the seeds used can be obtained; but, judging from the present herbage, the mixture appears to have been good, consisting of Cocksfoot, Timothy, Rye-grass, Foftail, and Dog's-tail, with Red and White Clover. Probably there was also some Hard Fescue, but the conditions for its growth not being favourable, it has nearly disappeared. The field has become over-run with Twitch or Bent-grass. This is one of the first grasses to take possession of unoccupied ground, and as it seeds freely, it quickly spreads. It is an inferior grass and is eaten by stock when they can get no better; it is not a favourite food. Another blown seed, or perhaps an impurity in the seeds used for laying the field down, is Yorkshire Fog, a grass left untouched by all stock unless hunger drives them to it.

Taking the field, however, as a whole, the herbage is satisfactory, the real desideratum is a better supply of water food.

In seasons when the soil is kept supplied with rain, as good a crop is obtained as is possible from a clay soil three or four inches deep, but when this is dried up all growth is arrested.

I should classify the field, in regard to the amount of food produced, as poor this year, though the recent rains have already made a difference.

#### REPORT OF THE BOTANICAL VISITOR.

The Society's Botanical Visitor (Mr. F. J. Rowbotham) reports as follows:—

Date of visit, June 24th, 1895.

In the choice of this site an excellent opportunity has been afforded of testing the value of manurial treatment on some of the poorest clay lands of Sussex.

The pasture, about 10 acres in extent, has been down about nine years. It is not known by whom the seeds were supplied, but the mixture is stated to have been one usually employed in the district. Since the first seeding a few pounds per acre of different sorts of clover have been applied.

The top soil comprises about 4 inches of stiff clay resting upon the Weald Clay. The field is said to be well drained. Manure, in the form of Basic Slag, was last applied in 1893. The field has a slight slope to the north. The herbage shows signs of having been badly scorched.

The following is a list of the grasses, clovers, and other plants met with in the hurdled portion, together with their relative proportions:—

| (a) Grasses.  | Relative Proportions. |
|---|-----------------------|
| Brome, Soft Field ( <i>Bromus mollis</i> ) .. ..                | Scarce.               |
| Cocksfoot ( <i>Dactylis glomerata</i> ) .. ..                   | Plentiful.            |
| Dog's-tail, Crested ( <i>Cynosurus cristatus</i> )              | Plentiful.            |
| Fescue, Hard ( <i>Festuca duriuscula</i> ) .. ..                | Rather scarce.        |
| Fiorin ( <i>Agrostis alba</i> ) .. .. .                         | Not plentiful.        |
| Foxtail, Meadow ( <i>Alopecurus pratensis</i> )                 | Not plentiful.        |
| Meadow - grass, Smooth-stalked ( <i>Poa pratensis</i> ) .. .. . | Scarce.               |
| Rye-grass, Perennial ( <i>Lolium perenne</i> ) ..               | Abundant.             |
| Timothy ( <i>Phleum pratense</i> ) .. .. .                      | Abundant.             |
| Twitch or Bent ( <i>Agrostis vulgaris</i> ) .. ..               | Abundant.             |
| Vernal - grass, Sweet ( <i>Anthoxanthum odoratum</i> ) .. .. .  | Here and there.       |
| Yorkshire Fog ( <i>Holcus lanatus</i> ) .. ..                   | Abundant.             |
| (b) Clovers and other Leguminous Plants.                        |                       |
| Clover, White or Dutch ( <i>Trifolium repens</i> )              | Scarce.               |
| Trefoil, Bird's-foot ( <i>Lotus corniculatus</i> ) ..           | Scarce.               |
| Yellow Suckling ( <i>Trifolium minus</i> ) .. ..                | Scarce.               |

| (c) All other Plants.                            | Relative Proportions. |
|--|-----------------------|
| Bindweed, Field ( <i>Convolvulus arvensis</i> )  | Scarce.               |
| Buttercup, Creeping ( <i>Ranunculus repens</i> ) | Very scarce.          |
| Cat's-ear ( <i>Hypochaeris radicata</i> ) .. ..  | Scarce.               |
| Dandelion ( <i>Taraxacum officinale</i> ) .. ..  | Scarce.               |
| Moss <i>sp.</i> .. ..                            | .. ..                 |
| Self-heal ( <i>Brunella vulgaris</i> ) .. ..     | Scarce.               |
| Sorrel, Common ( <i>Rumex Acetosa</i> ) .. ..    | Scarce.               |

The soil is terribly parched, with gaping fissures, and the herbage is thin and scanty. With some exceptions, which I shall particularise, the portion selected for experiment fairly represents the entire field, and the hurdled portion may be taken to fairly represent the experimental area.

At the upper end of the field, and just outside the boundary of the experimental area, is a pond thickly fringed by rush, sedge, and undergrowth. About here the gramineous herbage grows thinner—more bare soil being visible—with some increase in the proportion of clovers and weeds. I could not, however, detect any decided change in the relative proportion of the grasses.

On the western side of the field a slight dip occurs (the hollow not being included, I believe, in the experimental area), and here I noticed abundance of rush and sedge. Elsewhere the rush is confined to the borders, while sedge does not show itself in any other portion of the field. Two species of moss are very general, occupying much of the bare spaces between the grasses.

As regards the gramineous herbage, the principal components are Twitch or Bent, Timothy, Perennial Rye, and Cocksfoot, the first-named being specially abundant. These four grasses are pretty evenly distributed over the field. Crested Dog's-tail is common, and Yorkshire Fog plentiful everywhere. Sweet Vernal-grass appears only in patches. Yellow Oat-grass (*Avena flavescens*) is seen here and there, but is nowhere plentiful, and does not occur within the hurdled portion. Very little Hard Fescue is observable, but there is a fair sprinkling of Meadow Foxtail. Meadow-grass is not at all frequent. Soft Brome-grass occurs here and there, but the plants are all of small size.

The scarcity of Buttercup, and indeed of weeds generally, is very marked. Clovers are scarce, and a few plants of Creeping Thistle (*Cnicus arvensis*) occur near the borders of the field.

The occupier states that in a wet growing season the field is decidedly better, the bottom growth in such case being greatly increased. It will be seen that Timothy appears to do fairly well here, but—as is the case likewise with Cocksfoot—the growth is stronger about the borders where the soil is damper.

It seems obvious that while the soil is capable of supporting a number of good grasses, the contest for space is very feeble, and



*for the Improvement of Permanent Pasture.*

this is no doubt largely due, as in other cases, to the dry season.

The field, I may observe, abounds in rabbits.

The traces of hedges which formerly traversed the observable, the track of one of these running north and being marked by a luxuriant growth of Yorkshire Fog.

The pasture is estimated to carry six or seven head in a growing season, but it does not bear a good dairy crop. The feeding stuffs used have been corn and cake.

Circumstances would seem chiefly to favour the sward. Twitch in this field. When the site was visited in September last, the rains which had occurred in the interim had put on the tender shoots of this grass to an extent which gave the field quite a different aspect. From having, as seen in September, little or no bottom growth at all, the field showed in September a capital feed; and this marked improvement would have been entirely the result of the supply of much moisture. It was observed, too, that Foxtail and Timothy were flowering for the second time this year.

**RECOMMENDATIONS AS TO TREATMENT GIVEN BY THE SOCIETY'S STEWARDS AND CONSULTING OFFICIALS.**

Poor Field, West Grinstead, Sussex.

|                                  |  |  |  |  |                 |
|----------------------------------|--|--|--|--|-----------------|
|                                  | <i>Dung.—10 loads per acre, right across.</i>                              |  |  |  |                 |
| <i>Lime.</i><br>2 tons per acre. | <i>Superphosphate.—3 cwt. per acre.</i><br><i>Kainit.—2 cwt. per acre.</i> | <i>Superphosphate.</i><br>4 cwt. per acre. | <i>Basic Slag.—4 cwt. per acre.</i><br>(To be followed by 4 cwt. next year.) | <i>Basic Slag.</i><br>8 cwt. per acre in one dressing. | <i>Nothing.</i> |
|                                  | <i>Superphosphate.</i><br><i>Kainit.</i>                                   |  | <i>Basic Slag.—4 cwt. per acre.</i><br>(To be followed by 4 cwt. next year.) | 8 cwt.   |                 |
|                                  | <i>Salt.—4 cwt. per acre, right across.</i>                                |  |  |  |                 |

Lime  
 Basic Slag  
 Superphosphate  
 Kainit  
 Salt

} to be applied in winter.

Dung to be applied in early spring.

The approximate cost of the artificial dressings will be :—

|                           |       |                |
|---------------------------|-------|----------------|
| Superphosphate and kainit | .. .. | 13s. per acre. |
| Superphosphate            | .. .. | 10s. " "       |
| Basic slag                | .. .. | 20s. " "       |
| Salt                      | .. .. | 8s. " "        |

No addition to the herbage is recommended.

#### EXPERIMENTAL SITE NO. 6, AT YEOVILTON, SOMERSET.

Owned by J. K. D. Wingfield Digby, Esq., M.P., and occupied by Messrs. E. & E. Haine, of Yeovilton, Ilchester, Somerset, who supply the following particulars :—

|   |       |   |
|---|-------|---|
| Nearest railway station                         | .. .. | Sparkford or Marston (G. W. R.).  |
| Distance from ditto                             | .. .. | Four and a half to five miles.  |
| Name of Field                                   | .. .. | Bineham Field.  |
| Area  | .. .. | 32 a., 1 r., 35 p.  |
| Number on Ordnance Survey map                   | .. .. | 108.  |
| Geological strata                               | .. .. | Lower Lias.   |
| Thickness of top-soil                           | .. .. | Six to ten inches.  |
| Colour of ditto                                 | .. .. | Brown.  |
| Character of ditto                              | .. .. | Stiff working.  |
| Thickness of sub-soil                           | .. .. | Several feet.   |
| Colour of ditto                                 | .. .. | Yellow.   |
| Character of ditto                              | .. .. | Very stiff.   |
| Nature of district                              | .. .. | Very flat with slight undulations.  |
| Nature of Field                                 | .. .. | { Fairly level, with a gentle slope towards the south.  |
| Height above sea-level                          | .. .. | About sixty-six feet.   |
| Situation of cattle-yard                        | .. .. | Half a mile from farm buildings.  |
| Drainage  | .. .. | Pipe-drained and draws fairly well.   |
| Nature of grass                                 | .. .. | { Much better in quality at the south end where the soil is more alluvial.  |
| Length of time known to have been down to grass | .. .. | { Eighteen or nineteen years.   |
| When sown                                       | .. .. | Spring, with oat crop.  |
| Description of grass seeds sown                 | .. .. | { Believed to be White Dutch Clover and Italian Rye-grass.  |
| Nature of season when the seeds were sown       | .. .. | { Fairly good.  |
| When usually mown or grazed                     | .. .. | { Generally grazed, but skimmed over occasionally.  |
| When last mown or grazed                        | .. .. | { Grazed, but skimmed over in Aug. 1894.  |
| Nature of herbage                               | .. .. | { It tends to scorch or burn in a dry summer. It possesses the purging quality known as "teart," and to a certain extent it has the same effect when given to cattle. |
| When last manured                               | .. .. | { In spring of 1893.  |
| Nature of manure                                | .. .. | { Yard manure with road-scrapings.  |

*for the Improvement of Permanent Pasture.*

|                                   |   |                               |
|-----------------------------------|---|-------------------------------|
| Feeding stuffs used during last   | } | Cotton-cake (in small quant   |
| five years for the cattle grazing |   |                               |
| the Field .. .. .                 |   |                               |
| Reputation of Field .. .. .       | } | Not one on which dairy cows v |
| Description of Field .. .. .      |   |                               |
|                                   |   | { Not so good as permanen     |
|                                   |   | adjoining.                    |

**REPORT OF THE CONSULTING CHEMIST.**

The Society's Consulting Chemist (Dr. Voelcker) reports the site as follows :—

Dates of visits, June 8th and November 15th, 1895.

Number of soils analysed. One.

There is a marked deficiency of nitrogen, but abundant food of other kinds.

The soil contains large amounts of lime and magnesia

There is no evidence of the presence of any ingredients to be deleterious to the growth of herbage, although the fact of the land being "teart" it was thought that there be purging salts in the soil; but this was not found in the case in the sample of soil sent for analysis. The soil is stiff, and must be hard to cultivate.

The analysis of the soil is as follows :—

|  |        |
|--|--------|
| *Organic matter and loss on heating .. | 8.83   |
| Oxide of iron .. .. .                  | 5.43   |
| Alumina .. .. .                        | 8.28   |
| Lime .. .. .                           | 8.06   |
| Magnesia .. .. .                       | 1.03   |
| Potash .. .. .                         | .87    |
| Soda .. .. .                           | .22    |
| Phosphoric acid .. .. .                | .26    |
| Sulphuric acid .. .. .                 | .08    |
| **Carbonic acid .. .. .                | 5.01   |
| Nitric acid .. .. .                    | trace  |
| Insoluble silicates and sand .. .. .   | 61.93  |
|  | <hr/>  |
|  | 100.00 |
| *Containing nitrogen .. .. .           | .07    |
| **Equal to carbonate of lime .. .. .   | 11.39  |

The only real deficiency being in nitrogen, it is not that manuring will do much good. Dung should be used to supply this deficiency. This, and a material used locally, viz., road-scrappings and lime, are suggested as bettering the mechanical state of the land. It may be better to try the cheap manure, basic slag. The addition of basic slag is suggested as likely to produce good grass and to check the rankness of the grass (a fault believed here to it).

It is important also to try two other remedial schemes:—

- (a) That of giving stock soft water in one part of a field while other stock have the natural hard water of the Lias clay in another part.
- (b) That of keeping stock off the land longer than is usually done.

#### REPORT OF THE CONSULTING BOTANIST.

The Society's Consulting Botanist (Mr. Carruthers) reports as follows:—

There is nothing in the kinds of vegetation to account for the teartness.

The chief grasses on the "teart" land are—Cocksfoot, Ryegrass, and Hard Fescue. In lesser quantity there are Twitch, Dog's-tail, Yellow Oat-grass, and Brome-grass; and in still smaller quantity, Tall Fescue and Tall Oat-grass.

White Clover is abundant, though not evenly distributed through the field. There is also a fair amount of Red Clover. Yarrow occurs in fair quantity, but chiefly in patches.

There are a good many weeds in the field, but none of them are injurious to stock, except to some extent the Buttercup, and all of them occur in pastures throughout England without causing injury to stock. The most abundant are Hawk's-bean, Buttercup, and Thistle; then come Silver-weed, Agrimony, Wild Carrot, Ribwort, Dog Daisy, Meadow-sweet, and Dandelion.

I do not consider it in the least probable that any modification of the herbage would affect the teartness.

I was told by the farmer that the flooded lands were free from teartness, and that this condition was found only in the lands above the level of the annual floods. Mr. Rowbotham suggests that this may be due to the floods removing something injurious from the fields which they cover. This suggestion deserves consideration. I was also told that new herbage, one or two years showed very little of the teart quality. It may be that the plants in the flooded lands, finding a large quantity of water left in the soil, do not need to send their roots far in search of it, while the plants on the higher and drier places have to seek for a continuous supply of water from the sub-soil, and that there they find water saturated with some soluble material which when taken up by the plant causes the irritation in the stock feeding on it. The difference between a new pasture and an old, in the degree of teartness the

possess, may be due to the plants of the newer pasture being feeders in the surface soil only, while the older vegetation has its roots extending into the sub-soil.

Mr. Rowbotham was told that the teartness was most marked in the vigorous spring growth of the herbage, and that as the vegetation dried under the influence of the summer's sun, it gradually decreased in virulence, but that it returned again with the active growth of the autumn. Thereafter the frost somewhat modified its activity.

When the herbage on grass lands is hayed no injurious effect follows its consumption.

#### REPORT OF THE BOTANICAL VISITOR.

The Society's Botanical Visitor (Mr. F. J. Rowbotham) reports as follows:—

Date of visit, September 26th, 1895.

The selection of this site for experimental purposes is based upon the fact that the herbage possesses the peculiar purgative quality known as "teart." The field comprises about 32 acres and forms part of a wide district of grass-land, more or less similarly affected, situated upon the geological formation of the Lower Lias.

The pasture has been down about eighteen years, when it was sown, along with spring oats, with, it is believed, White Dutch Clover and Italian Rye-grass (*Lolium Italicum*). No seeds or renovating mixture have since been applied, and the pasture has been allowed to develop itself, being merely skimmed over occasionally. Farmyard manure with road-scrappings was last applied in the spring of 1893. The top-soil comprises 6 to 10 inches of stiff brown clay, changing to yellow below where the sub-soil rests upon the Lias rock. The field is piped and drained, and is fairly level, the slight slope being towards the south. At the south end of the field the top-soil changes; the ground here is contiguous to the river, and, being liable to flooding, a layer of alluvial material has been deposited. Over this portion the herbage is stated to be of much better quality.

The following is a list of the grasses,\* clovers, and other plants met with in the hurdled portion, together with the relative proportions:—

---

\* Owing to the delay in the selection of this site, the hurdles had not recently been fixed when the field was inspected, and consequently stock had grazed freely over the pasture. It was therefore very difficult to determine with exactitude the varieties of grasses present.

## (a) Grasses.

## Relative Proportions.

|  |                |
|--|----------------|
| Cocksfoot ( <i>Dactylis glomerata</i> ) .. ..      | Abundant.      |
| Dog's-tail, Crested ( <i>Cynosurus cristatus</i> ) | Not plentiful. |
| Fescue, Hard ( <i>Festuca duriuscula</i> ) ..      | Plentiful.     |
| Fiorin ( <i>Agrostis alba</i> ) .. ..              | Plentiful.     |
| Ont-grass, Yellow ( <i>Avena flavescens</i> ) ..   | Not plentiful. |
| Rye-grass, Perennial ( <i>Lolium perenne</i> ) ..  | Plentiful.     |

## (b) Clovers and other Leguminous Plants.

|  |                |
|--|----------------|
| Clover, Red ( <i>Trifolium pratense</i> ) .. ..    | Not plentiful. |
| Clover, White or Dutch ( <i>Trifolium repens</i> ) | Plentiful.     |

## (c) All other Plants.

|   |                      |
|---|----------------------|
| Agrimony ( <i>Agrimonia Eupatoria</i> ) .. ..                       | Few plants.          |
| Buttercup, Creeping ( <i>Ranunculus repens</i> )                    | Plentiful in places. |
| Carrot, Wild ( <i>Daucus Carota</i> ) .. ..                         | Few plants.          |
| Hawkbit, Autumnal ( <i>Leontodon autum-</i><br><i>nalis</i> ) .. .. | Plentiful.           |
| Hawk's-beard, Smooth ( <i>Crepis virens</i> ) ..                    | Abundant.            |
| Ribwort ( <i>Plantago lanceolata</i> ) .. ..                        | Not plentiful.       |
| Thistle, Creeping Plume ( <i>Cnicus arvensis</i> )                  | Plentiful.           |

Outside the hurdled portion abundance of Yarrow (*Achillea Millefolium*) is seen, as also several other composites, a small proportion of Ribwort, and here and there Wild Carrot. Buttercup is abundant in places.

The field is traversed by ridges, which have remained from the period when the land was under tillage. The hollows between the ridges form channels for the surface drainage, and, as might be expected, the vegetation varies somewhat from ridge to ridge. The herbage over the whole area, in fact, varies a good deal, partly as the result of differences in the character of the soil. This is particularly noticeable at the lowermost end, where the soil is sandy or alluvial. The growth generally is ranker here than elsewhere, with a surprising quantity of the Silver-weed (*Potentilla anserina*), especially in the hollows between the ridges. This weed dies out as the higher ground is approached. The 8 or 10 acres comprised by the alluvial deposit are in marked contrast with the middle and upper portions of the field, and, in the opinion of the occupiers, are worth 20 acres of the rest of the meadow. At the bottom of the field, Hassock-grass (*Deschampsia cespitosa*), which is scarce on the higher ground, occurs plentifully, with other coarse grasses, while the soil, despite the dry weather prevailing, is decidedly wet. Here, too, I noted a few plants of Timothy-grass (*Phleum pratense*)—the only specimens seen on the field. The Cocksfoot here attains a very coarse growth, and there is a sprinkling of damp-loving grasses, such as the Wood-sedge (*Melica amiflora*), &c. It should be noted, however, that

this portion of the field is probably outside the experimental area; but attention is, I think, properly directed to it as an example of change of character, and also in view of the fact that stock have free access to this as to other parts of the field.

Cocksfoot is everywhere the most abundant grass; but, except in the portion of the field just described, it does not attain to any considerable height. Hassock-grass is not general, being chiefly confined to the ridge hollows. Hard Fescue occurs plentifully, there being extensive patches consisting almost exclusively of this grass, which apparently is not confined to any particular portion of the field. Outside the hurdled portion plenty of Crested Dog's-tail is to be seen, with Fiorin-grass.

With respect to the "teart" character of the herbage of this and other land in the neighbourhood, the occupiers state that this character belongs chiefly to land which is *not* subjected to periodic floods. Where, on the other hand, the surface is liable to submergence by the adjoining river at certain periods, the teartness is not at all marked. The characteristic, moreover, is more decided in the spring, following upon the early rains and increased vegetative growth, than at any other time of the year. As the season advances it becomes less manifest, returning in the fall after the autumnal rainfall and continuing until the end of October, when the land becomes once more fit for grazing. The quality of teart land is much improved by dryness—especially where the grass, having come well up, becomes top-dried; and a like improvement is to be noted following upon the frosts of late autumn.

It is a noteworthy fact that of two adjoining fields in this district, apparently similar in respect of soil, one will possess the teart character and the other be devoid of any injurious affect upon stock. On teart land healthy stock depreciate at a rapid rate. Cattle so placed become purged and lose both flesh and colour in a space of three weeks. The change or loss of colour is very marked. Cows after calving go off milk very quickly, and stock, when removed to better land, only recover slowly. The relative effect of teart herbage upon stock appears to be as follows:—(1) Cattle, in a strong degree; (2) Sheep, in a lesser degree; (3) Horses, hardly at all. Stock of all kinds it would seem may be safely wintered upon teart land.

The effects of teart herbage are less manifest when made into hay as a result, it is believed, of drying. Feeding with cotton cake on teart land to some extent counteracts the evil effects of the herbage.

### RECOMMENDATIONS AS TO TREATMENT GIVEN BY THE SOCIETY'S STEWARDS AND CONSULTING OFFICIALS.

"Teart" land at Yeovilton, Somerset, to be treated thus:—

*a. Manurial Experiments—in large field.*

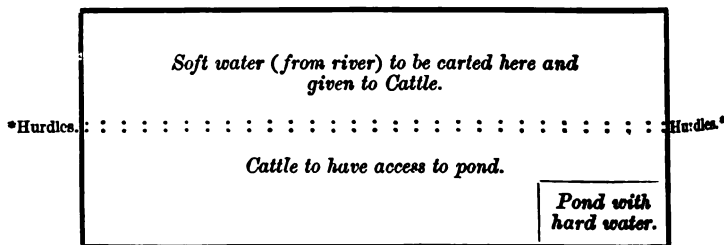
|                                    |   |  |                 |
|------------------------------------|---|--|-----------------|
| <i>Dung.</i><br>15 loads per acre. | <i>Basic Slag 8 cwt.</i><br>and <i>Kainit</i><br>2 cwt. per acre. | <i>Road-Scrappings</i><br>and <i>Lime.</i> | <i>Nothing.</i> |
|------------------------------------|---|--|-----------------|

**4 Plots—1 acre each.**

Dung  
Basic Slag  
Kainit  
Road - Scrapings  
and Lime } to be applied in winter.

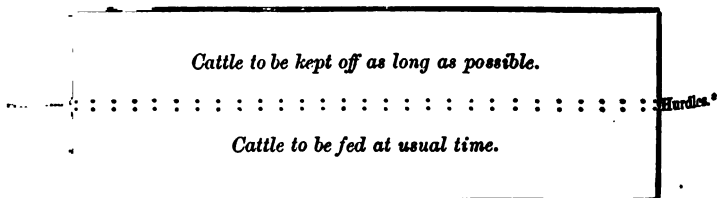
The cost of the basic slag and kainit mixture will be, approximately, 25s. per acre.

*b. Experiment on Soft Water versus Hard Water. Small field adjoining large field.*



\* Hurdling has to be done here.

*Experiment on Early and Late feeding of grass ("Teart" land)—in a third field.*



fundling has to be done here.

portion of the herbage of several teart fields to be  
in the spring, when the teartness is worst, and tested



for the presence of any soluble salts likely to affect the stock feeding on it.

2. The extent and boundaries of teart lands on several farms to be carefully set out on sheets of the 6-inch Survey Maps, for the purpose of seeing whether there is any condition of soil and sub-soil common to these lands.

3. Water to be drained into a hole some 8 feet deep and to be analysed for the presence of soluble salts of a purging character.

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XVI.—*Annual Report of the Society's Consulting Chemist*  
(DR. J. A. VOELCKER, M.A., F.I.C., &c.).

IN the course of the year only nine samples have been submitted to me, under the Society's privileges. These were as follows :—

|                        |    |    |    |    |    |    |    |   |
|------------------------|----|----|----|----|----|----|----|---|
| Waters                 | .. | .. | .. | .. | .. | .. | .. | 4 |
| Milks                  | .. | .. | .. | .. | .. | .. | .. | 4 |
| Precipitated Phosphate | .. | .. | .. | .. | .. | .. | .. | 1 |

Of the four samples of water, three were found to be perfectly good, but the fourth to be badly polluted. In one case it was reported that cattle drinking the water were much subject to 'scouring,' and I thought it not unlikely therefore that I might find its composition to be similar to that of waters from the "scouring pastures" found on parts of the lias formation in Somerset. These waters are very hard and contain upwards of 200 grains of solid constituents per gallon, included in which are the purging salts, sulphate of soda, and sulphate of magnesia in considerable quantities. However, in this case I found that the water had only twenty-two grains of solid residue per gallon, and but quite small amounts of soda and magnesia salts, nor was there anything in its composition to attribute the scouring to.

The four samples of milk sent illustrate the error that may be made by drawing samples direct from the cow and not including the "strippings" in the sample intended to represent the general yield.

A Member of the Society sent me, in the first instance, three samples of milk, being one from each twenty-three cows which he had, and of the poor quality of which he complained. The analyses were :—

|                   | I.            |    | II.           |    | III.          |
|-------------------|---------------|----|---------------|----|---------------|
| Water .. ..       | 89·67         | .. | 89·60         | .. | 89·40         |
| Fat .. ..         | ·66           | .. | ·76           | .. | ·98           |
| Solids-not-fat .. | 9·67          | .. | 9·64          | .. | 9·62          |
|                   | <u>100·00</u> | .. | <u>100·00</u> | .. | <u>100·00</u> |

These were little better than skim milks, and on inquiring how they were taken, I learned that the milk was drawn direct from the cows into the sample bottles. I thereupon requested that the cows should be milked thoroughly dry, and a sample of the mixed milk be sent to me. This was done and it yielded :—

|                   |               |
|-------------------|---------------|
| Water .. ..       | 86·99         |
| Fat .. ..         | 4·32          |
| Solids-not-fat .. | 8·69          |
|                   | <u>100·00</u> |

This was milk of good quality, and the difference between it and the former samples was very marked.

In addition to the foregoing samples there have been analysed by me for the Society :—

Four samples of soil in connection with the Experimental Cheese School, and five samples of soil in connection with the Society's Grass Experiments.

## XVII.—*Annual Report of the Society's Consulting Botanist* (W. CARRUTHERS, F.R.S.).

THE principal work done for the Society during 1895 has consisted in examining and reporting on the pasture of the farm on which the Dairy School was held during the past year; in examining the pasture of the five localities in which it is proposed to make experiments with pasture lands, and reporting thereon, with recommendations as to the treatment of the herbage; and in examining and reporting on the herbage of the farm at Yeovilton, where it is proposed to make investigations as to the cause of "teariness" in some pastures.

I have answered all inquiries as to plant injuries and received from Members of the Society, but no samples of seeds have been submitted to me by any Member.

XVIII.—*The Society's Exhibition at Taunton.* By THOS. F. PLOWMAN, Secretary and Editor.

ATTENDANCE, &c.

IN 1895 the Society, for the third time in its history, held its Annual Exhibition at Taunton, its previous visits having taken place in 1852 and 1870.

A plan showing the situation and arrangement of the Show Yard will be found facing the title-page of this volume.

The Exhibition was opened on Wednesday, May 29, and closed on Monday, June 3.

The total number of persons paying for admission was 43,292, as against 38,484 at Guildford in the previous year.

A comparative statement of attendances since 1852 will be found on pages ci., cii. of the Appendix to this volume.

PRIZES.

The following table shows how the money prizes were apportioned at the 1895 Exhibition, and also, for purposes of comparison, at the 1870 and 1894 Exhibitions:—

|                             | Taunton,<br>1870. |    |    | Guildford,<br>1891. |    |    | Taunton,<br>1895. |    |    |
|-----------------------------|-------------------|----|----|---------------------|----|----|-------------------|----|----|
|                             | £                 | s. | d. | £                   | s. | d. | £                 | s. | d. |
| Horses .. .. .              | 240               | 0  | 0  | 536                 | 0  | 0  | 567               | 0  | 0  |
| Cattle .. .. .              | 485               | 0  | 0  | 1,221               | 10 | 0  | 1,290             | 10 | 0  |
| Sheep .. .. .               | 383               | 0  | 0  | 525                 | 0  | 0  | 492               | 0  | 0  |
| Pigs .. .. .                | 96                | 0  | 0  | 260                 | 0  | 0  | 260               | 0  | 0  |
| Poultry and Pigeons .. .. . | 150               | 10 | 0  | 190                 | 10 | 0  | 188               | 0  | 0  |
| Dairying .. .. .            | ..                | .. | .. | 279                 | 0  | 0  | 384               | 10 | 0  |
| Horse Shoeing .. .. .       | 6                 | 6  | 0  | 22                  | 0  | 0  | 24                | 2  | 0  |
| Sheep-Shearing .. .. .      | ..                | .. | .. | 10                  | 0  | 0  | 20                | 0  | 0  |
| Farm Produce .. .. .        | ..                | .. | .. | 46                  | 0  | 0  | 36                | 0  | 0  |
| Totals .. .. .              | 1,360             | 16 | 0  | 3,090               | 0  | 0  | 3,262             | 2  | 0  |

The money prizes were contributed as follows:—

|   | £     | s. | d. |
|---|-------|----|----|
| Bath and West and Southern Counties Society ..  | 2,961 | 10 | 0  |
| Somerset Agricultural Association .. .. .       | 110   | 0  | 0  |
| Taunton Local Committee .. .. .                 | 85    | 0  | 0  |
| Somerset County Council .. .. .                 | 50    | 0  | 0  |
| English Jersey Cattle Society .. .. .           | 19    | 0  | 0  |
| Kerry and Dexter Cattle Society .. .. .         | 10    | 10 | 0  |
| Shropshire Sheep Breeders' Association .. .. .  | 10    | 0  | 0  |
| English Guernsey Cattle Society .. .. .         | 9     | 0  | 0  |
| Dorset Horn Sheep Breeders' Association .. .. . | 5     | 0  | 0  |
| Worshipful Company of Farriers .. .. .          | 2     | 2  | 0  |
|   | 3,262 | 2  | 0  |

Medals or Plate were also contributed by the Bath and West and Southern Counties Society, the Shire Horse Society, the Hunters' Improvement Society, English Jersey Cattle Society, English Guernsey Cattle Society, and the Proprietor of Corner's Oils.

## ENTRIES.

The following is a comparative statement of the entries in the various classes. Owing to the prevalence of swine fever, entries of Pigs could not be received in either 1894 or 1895 :—

|   | Taunton,<br>1870. | Guildford,<br>1894. | Taunton,<br>1895. |
|---|-------------------|---------------------|-------------------|
| <b>HORSES :—</b>                          |                   |                     |                   |
| Agricultural .. .. .                      | 24                | 55                  | 72                |
| Hunters, Hacks, Ponies, and Harness ..    | 58                | 55                  | 64                |
|   | — 82              | — 110               | — 136             |
| <b>CATTLE :—</b>                          |                   |                     |                   |
| Devons .. .. .                            | 38                | 35                  | 48                |
| Shorthorns .. .. .                        | 32                | 50                  | 68                |
| Herefords .. .. .                         | 35                | 40                  | 38                |
| Sussex .. .. .                            | 13                | 58                  | 34                |
| Jersey .. .. .                            | 14                | 172                 | 163               |
| Guernsey .. .. .                          |                   | 68                  | 71                |
| Aberdeen Angus .. .. .                    |                   | 11                  | 4                 |
| Kerry and Dexter .. .. .                  |                   | 16                  | 41                |
| Any Breed .. .. .                         |                   | ..                  | ..                |
| Butter Test .. .. .                       |                   | 20                  | 23                |
|   | — 132             | — 470               | — 490             |
| <b>SHEEP .. .. .</b>                      | 218               | 238                 | 212               |
| <b>PIGS .. .. .</b>                       | 88                | ..                  | ..                |
| <b>POULTRY and PIGEONS .. .. .</b>        | 362               | 430                 | 406               |
| <b>DAIRY PRODUCE :—</b>                   |                   |                     |                   |
| Cheese .. .. .                            | ..                | 97                  | 164               |
| Butter .. .. .                            | ..                | 99                  | 206               |
| Cream .. .. .                             | ..                | 10                  | 11                |
|   |                   | — 206               | — 387             |
| <b>CREAM-SEPARATORS .. .. .</b>           | ..                | 7                   | 3                 |
| <b>MISCELLANEOUS FARM PRODUCE .. .. .</b> | ..                | 17                  | 39                |
| <b>COMPETITIONS :—</b>                    |                   |                     |                   |
| Butter-Making .. .. .                     | ..                | 190                 | 283               |
| Horse-Shoeing .. .. .                     | 26                | 57                  | 113               |
| Sheep-Shearing .. .. .                    | ..                | 7                   | 38                |
| Milking .. .. .                           | ..                | ..                  | 17                |
|   | — 26              | — 254               | — 451             |
|   | 908               | 1,732               | 2,118             |

A list of the awards, names of the Judges, &c., will be found in the Appendix to this volume.

### IMPLEMENTS:

The following is a comparative statement of the space occupied by Implements, Machinery, &c.

|  |     | Taunton,<br>1870. | Gulldford,<br>1894. | Taunton,<br>1895. |
|--|-----|-------------------|---------------------|-------------------|
| Machinery in Motion Shedding, feet run       |     | 700               | 1,106               | 1,190             |
| Agricultural Implements } " }                |     |                   | 4,595               | 4,550             |
| Shedding .. .. . }                           | " } | 5,906             | 880                 | 877               |
| Seeds, Cattle Foods, &c., Shedding .. .. . } | " } |                   | 840                 | 710               |
| Carriages, &c., Shedding .. .. . }           | " } |                   | 10,681              | 18,150            |
| Open Space .. .. . sq. feet                  |     |                   | 18,102              | 25,477            |

### MISCELLANEOUS DEPARTMENTS.

A fully-equipped Working Dairy was, as usual, a prominent feature of the Show Yard. The Butter-making Competitions were held in it, and practical demonstrations were given daily by Professor Carrol, of Glasnevin, and the Society's Dairy School Teachers. Dr. J. A. Voelcker, M.A., F.I.C., the Society's Consulting Chemist, also delivered a lecture upon "The Production and Sale of Milk," which will be found on pages 81-84 of this volume.

The Exhibitions of Pictures, Art Manufactures, and Plants and Flowers were fully up to the average of previous year and there was no diminution of interest in them on the part of the public. The customary Art Union was held, and a list of the prize winners and of the pictures chosen will be found on pages lx., lxi. of the Appendix to this volume.

Lectures on and practical instruction in bee-keeping were given each day under the auspices of the British Bee-keeper Association.

The band of the Portsmouth Division of the Royal Marine Light Infantry performed daily.

The usual Sunday service, at which there was an exceptionally large attendance of herdsman and others engaged in the Yard was held in the Working Dairy. It was conducted by the Rev. T. E. M. Barrow, Vicar of St. John's, Taunton, and the sermon was preached by the Right Rev. the Bishop of Bath and Wells.

## ANNUAL MEETING OF MEMBERS.

At the Annual General Meeting of Members, held on the third day of the Show in the Council Pavilion, and presided over by the President (The Viscount Portman), the following Report of the Council was received and adopted:—

The Council, in presenting their Annual Report, congratulate the Members upon meeting once more at Taunton, the scene in 1852 of "the great revival" of the Society, when the scheme which provided for the holding of its meetings in different localities in successive years first came into operation. The records of the Society amply testify how much it owes to this resuscitation and how largely its area of usefulness was extended thereby. The hearty welcome which Taunton then accorded the Society did much to promote the success of the new departure by the impetus which it gave to it at the start. The kindly interest of the town and neighbourhood in the Society's welfare was again manifested when a second visit was paid in 1870, and the cordiality of the reception which the Society has met with on the present occasion is a sufficient assurance that time has not impaired the old friendship.

The Council regret that during the past twelvemonth the Society has lost, from death and other causes, an unusual number of old supporters, and at the end of the year the Members were forty-two less than at the corresponding period of the previous year. Owing, however, to the special exertions of a few Members of Council, and especially of two of the representatives of the North-Western Division, ninety-five new Members have since been elected, thirty-five of whom reside in Wales or Monmouth. The Members roll now stands at 1808.

Death has deprived the Society of an old and staunch supporter and Vice-President, Mr. Henry Gorges Moysey, who for many years took a keen and active interest in its operations, and rendered valuable service both as a Steward and as a member of several Committees. His willingness to serve the Society and his capacity for doing so were united to a kindliness and geniality which will long be held in pleasant remembrance by those with whom he was associated.

A special tribute is also due to the memory of Sir Jerom Murch, who has so recently passed away, and whose connection with the Society extended over a period of nearly forty years. Practical evidence of his unflagging interest in it was forthcoming on several occasions, especially when, as Mayor of Bath, he, in so hospitable spirit, welcomed the Society to its birthplace at the Centenary Meeting in 1877, and again in 1891, and did so much to promote the success of those Meetings. As a Vice-President of the Society and a long citizen of Bath, he exemplified in his own person the close connection which has so long existed between the Society and that city.

The ranks of the Vice-Presidents have been further impoverished by the deaths of Sir John Lubbock of Somerset, the Earl of Lovelace, and

John W. . . . . lost to the Society by the death of

Mr. R. H. Bush, who was for many years actively identified with it both as a Member of Council and as Steward of Poultry. Illness had, some time previous to his death, compelled him to relinquish his official connection with the Society, although he retained his interest in it, but his practical and ready help will not soon be forgotten, nor the cheerfulness with which it was rendered.

The Charity Commissioners having asked the Society to appoint a representative Governor of the Monmouthshire Agricultural School at Usk, the Council have complied with this request by the appointment of Mr. C. D. Phillips.

The Council, feeling that a thorough revision of the General Laws was desirable, appointed a Special Committee to undertake this and report thereon, and the result is appended. The recommendations of the Committee mainly relate to the phraseology in which the laws are expressed and their classification, and do not include any additions or alterations which can be said to embody any essential change in their spirit.

During the past year the Society has continued its efforts to promote practical education in dairying through the medium of its schools.

Under an arrangement with the Somerset County Council, one of the Society's travelling Butter Schools is continuing its visits to various centres in the county, and a fixed Cheese School has been opened at Haselbury, near Crewkerne. A travelling Butter School is also being conducted by the Society for the Devon County Council. The Council are glad to be able to state that those who look to dairying for a livelihood, and for whom the instruction was primarily intended, have not failed to take advantage of it, and this applies equally to both the Devon and Somerset Schools.

An experimental department, for the purpose of conducting skilled and systematic investigations with reference to dairying, has again been attached to the Cheese School, the experience of previous years having fully satisfied the Council of its value. Particulars of the results obtained have been published in the recent issue of the Society's Annual Journal.

The Society is conducting, on behalf of the Somerset County Council, a migratory School for the purpose of giving instruction in farriery to shoeing-smiths in Somerset, and since its opening in April as many pupils as could be received have attended regularly.

The desirability of experimenting on the improvement of grass land having frequently been urged upon the Council, they have set on foot a series of experiments in this direction. They are also repeating the experiments upon oats or barley carried on in 1894.

The Council are continuing the practical and scientific investigations in connection with Cider-making initiated two years ago. These have been the means of eliciting a considerable amount of valuable information, which has been published in the shape of a series of observations in the Society's Annual Journal.

The Board of Agriculture has once more borne testimony to the utility of the work of the Society by awarding a grant of 400*l.* in aid of its Field Experiments and researches into the processes of

**Cheddar Cheese-making.** Such a recognition has been a great encouragement, and has enabled the Council to engage more actively in such work than they otherwise could have done.

The present Exhibition affords satisfactory evidence of the Society's growth since its previous meeting at Taunton in 1870. The entries of stock, produce, &c., were then 908 in number as against 2,115 on the present occasion, whilst the space taken for implements and machinery was 9,200 feet as against 25,477 this year. The Council regret that owing to the unfortunate prevalence of swine fever a show of pigs was not practicable. Notwithstanding that no entries of pigs could be received, the present Show is the largest of stock and produce that the Society has ever held.

The Council have especial pleasure in acknowledging the friendly co-operation of the Somerset Agricultural Association, which suspended its Annual Show and contributed 110*l.* in special prizes. Under these circumstances your Council felt that they would be acting in accordance with the feelings of the Members generally if they conferred Members' privileges, with respect to entries and admission tickets for the Taunton Meeting, upon the Members of the Association, and this has accordingly been done.

The Council have gratefully to acknowledge the receipt of Special Prizes amounting to 85*l.* from the Taunton Local Committee, 50*l.* from the Somerset County Council, and others of varying amounts from the Shire Horse Society, the Hunters' Improvement Society, the English Jersey Cattle Society, the English Guernsey Cattle Society, the Kerry and Dexter Cattle Society, the Shropshire Sheep Breeders' Association, the Dorset Horn Sheep Breeders' Association, the Worshipful Company of Farriers, and from Mr. E. Corner.

The Council have accepted invitations to hold the Annual Meeting in 1896 at St. Albans; in 1897 at Southampton; and in 1898 at Cardiff.

They have much pleasure in recommending that the Earl of Clarendon be elected President for the ensuing year; that Mr. R. Neville-Grenville be elected a Vice-President of the Society; and that the gentlemen named on the Agenda Paper be elected Members of Council for the years 1895-7, in room of those retiring by rotation.

The Council desire to express their thanks to the Mayor of Taunton, the Members of the Local Committee, and the inhabitants of the town and neighbourhood generally, for the cordiality with which they have welcomed the Society, and the energy they have displayed in promoting the success of the Meeting.

Resolutions were passed adopting the recommendations contained in the Report with reference to the Society's Laws and the appointment of Officers; and special votes of thanks were presented to the Mayor and Local Committee of Taunton, the Railway Companies, and the retiring President.

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## The Note-Book.

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.—*Profitable Cultivation of Wheat.* By SIR J. B. LAWES, Bart.

THE great reduction in the area of wheat grown in this country, and the statement of farmers that their only object in growing any at all is to obtain the straw for thatching, is disturbing the minds of those who are not farmers. They ask how it is that the British farmer, whom we are proud to acknowledge as the best in the world, and who upon a given area produces larger crops of corn and a greater amount of meat than the farmers of any other country, who have the advantage of a market close to their doors, cannot grow wheat as cheaply as those who not only produce a much smaller quantity per acre, but have to pay carriage and freight some thousand miles away?

We are not wanting in suggestions as to how wheat can be more cheaply grown in England. One is, that the owner or tenant of a small holding could grow wheat cheaper than the tenant farmer of a larger area. But assuming this to be the case, it is evident that it would require a great many years to elapse before any impression could be made upon the yield of the whole country. I need not, therefore, refer to this remedy any further. Another has been suggested which, if likely to succeed, could be very quickly carried out. It has been boldly asserted that by the concentration of capital in labour and manure, profitable crops of wheat yielding 100 bushels per acre can be produced, and our nation be made independent of the supply of foreign corn. Although a practical farmer may laugh at such nonsense, to those who are not acquainted with the subject there might appear nothing improbable in the statement.

The continuous growth of wheat at Rothamsted for half a century in one field, with a great variety of manures and without any change in these manures, must necessarily add considerably to our knowledge upon several important points relating to this subject. The influence of climate upon the yield of the crop is very great, and with a measurement of fifty years we may fairly assume that the average of the whole would not differ much from that of the preceding or the succeeding fifty years. If we take the average produce of our wheat grown by the same manures over

the whole period, and compare it with the mean of the best and worst crop, it will be found that there is not much difference between them. For instance, the average produce of the farmyard dung gives  $33\frac{1}{2}$  bushels per acre, the highest yield in any one year being  $48\frac{1}{2}$  bushels, and the lowest, 16 bushels, giving a mean of  $32\frac{1}{2}$  bushels.

With one artificial manure the mean of the whole period gives a yield of 24 bushels per acre; while the mean of the best and worst season is 25 bushels. With the same manure applied in larger quantities, we have a mean for the whole period of  $36\frac{1}{2}$  bushels per acre, and a mean of the best and worst crop of 38 bushels. The conclusion I am disposed to draw from these figures is, that whatever may be the proposed yield of the crops, one of them must be one-half larger in order to provide for the influence of seasons. When we are told that by an increased expenditure of capital we can grow 100 bushels of wheat per acre, we may expect that in a very bad season only 50 bushels will be obtained. To make up this deficiency, we must, therefore, grow 150 bushels per acre another year!

What may be the climate of the future I do not pretend to foretell, but I think it is very probable that during the half-century before our experiments commenced the season of 1816 was quite as bad, and that of 1834 quite as good, as any which we have experienced during the latter half-century. With regard to these two seasons, Tooke, in his "History of Prices," says of 1816: "A lamentable deficiency in quantity, and a miserable deficiency in quality, the price rose from 52s. 6d. to 117s. per quarter." Of the crop of 1834, he says the harvest of that year was one of the most productive on record, and in spite of a heavy protective duty the price fell to 35s. per quarter. Having shown that the climate of each year has a predominant influence upon the yield of our wheat crop, I propose to point out why this must necessarily be the case.

It is well known that if we burn a quantity of wheat with the straw there remains only a small quantity of ash—not more than 5 or 6 per cent. of the whole. In one of our experiments, we supply every year in farmyard dung much more of the substances which are combustible than are carried off in the crop. Of other parts of the field we supply only the nitrogen which is about 1 per cent., and the mineral matter, which is about 5 per cent., leaving the crop to obtain the remaining 4 per cent. as it can. As we can obtain a larger crop by the artificial manures than by the dung, we can only conclude that it is the atmosphere, and not the soil, which furnishes the bulk of the crop.

... of the partners in a bank or a large mercantile

business was the owner of 90 or 95 per cent. of the capital employed, he would be entitled to, and would doubtless claim, preponderating voice in the management; and even if his vote of action might, in the opinion of his partners, be injurious to the success of the business, his very large share in it would enable him to overrule their objections. Now, a farmer is in a position very similar to that of the partners just mentioned, his principal partner being the sun, including climate in general, which furnishes (or produces) about 95 per cent. of the crop, and often carries on the business in a manner to which he farmer very much objects, but which he cannot control.

It has often been suggested that the remedy for lower prices is increased production, 40 bushels, worth half-a-crown per bushel, being equal in value to 20 at five shillings. In these experiments, the same manure which we know to be perfectly suitable to grow wheat, and which has in a very favourable season grown nearly 56 bushels per acre when applied in the proportion of one, two, and three, yields in the first an average of 24 bushels per acre; in the second, 33 bushels; and in the third, 36½ bushels. The increase in the second is therefore 9 bushels, and in the third, only 3½. So far, therefore, from low prices being an inducement to grow larger crops of wheat, they are quite the reverse; for, as every bushel grown after we have reached a very moderate yield costs more than the previous one, nothing but very high prices could justify a farmer in growing large crops.

While, however, the results of our experiments are not favourable either to the extension of the area of the wheat crop, or to increasing the yield so long as the present low prices continue, still, the knowledge acquired from them cannot but prove useful, and may act as a caution to those who are disposed to look upon the present generation of farmers as quite unfit to carry on their own business. Whatever the future may be, whether the 100 bushels of wheat per acre are to be supported by pea-sticks, as was suggested by a witness before the Royal Commission on Agricultural Distress, or whether the growth of wheat in Great Britain will become a matter of history, one thing appears to me to be quite certain: that by the continued reduction of arable land, and the increased area of permanent pasture, the soil will gradually accumulate a store of fertility which can be used by future wheat crops whenever prices advance to a point at which wheat can again be profitably cultivated.—*The Farmer and Stock-Breeder Year Book.*

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2.—*The Soil in its Relation to Disease and Sanitation.\** By G. V. POORE, M.D., F.R.C.P., London; Physician to University College Hospital; Professor of Clinical Medicine and Medical Jurisprudence, University College, London.

IN dealing with the relation of the earth to disease it behoves us to move with caution, and we shall do well at the outset to admit that there is very little knowledge of the subject which can be regarded as certain. We are in the land of conjectures, surmises, and plausible hypotheses, which perhaps are leading on to certain knowledge, but it will be necessary to check the dicta of the laboratories by experience gained outside of them. Such has always been the admirable custom in this country. Before we blame the earth for causing us harm we must be sure that the facts, or alleged facts, are supported by experience. Science unchecked by practice will certainly lead us astray in the future as it has done in the past, a new scientific fact imperfectly understood has potentialities for evil which are unbounded.

If we set aside for the present the question of malaria, which is undoubtedly primarily connected with certain soils, we have very little evidence that any other disease of practical importance is primarily connected with the soil. There appear to be two microbes which are present with tolerable constancy in the upper layers of the soil, which may cause tetanus (lockjaw) and malignant œdema; but as yet we are without any evidence that either of these diseases can be caused by drinking water which has percolated through the soil, or can rise as a miasm from the soil.

Phthisis (consumption), or rather death from phthisis, which is not quite the same thing, is said to be more prevalent on damp soils than on dry ones, and it has further been said that the death-rate from this disease has been reduced in certain towns by sewerage. This statement is not universally accepted, and even if it be true it does not necessarily inculpate the soil, because damp soils are cold, and patients with phthisis or any chronic lung trouble are very intolerant of cold and damp. It is very generally recognised that phthisis is prevalent in proportion to overcrowding, and that it is conveyed by tuberculous milk or meat seems to be certain as the result of recent experimental work. Any charge against the soil itself is as yet not proven.

Phosphoribacteria has been said to be prevalent on certain soils, but this assertion is now discredited, and we recognise that the

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\* A lecture reported in the 'Lancet.'

great cause of its spread is overcrowding. Its habitat, if it have any, outside the human body is not yet known.

Anthrax, which is due to a spore-bearing organism, can certainly be conveyed to animals browsing on grass soiled by the dung or blood of infected animals. The bacilli seem to die in the carcase of a dead animal within three days after death; and as, for spore formation, the free access of air and a temperature of 70° Fahr. are necessary, it is not likely that this goes on in the earth. Pasteur's assertion that anthrax spores may be brought to the surface by earthworms is discredited by Koch and others. Man, I believe, has never been infected with anthrax except by direct inoculation or, as in the woolsorter, by inhaling spores from infected wool or hides. Clearly, animals should not be allowed to browse in an infected field, and such fields should, where possible, be ploughed up and converted from pasture into arable land. The danger of burying animals dead of anthrax is considered unworthy of credence by those eminent veterinary authorities, Professor Brown and Professor McFadyean, and the latter has shown that the process of putrefaction is fatal to the virulence of the tissues of the dead animal.

Enteric fever and cholera are both recognised in this country as mainly, if not entirely, water-borne diseases. That these diseases are produced in most cases by the direct infection of water by the excreta of infected patients is in Europe very generally acknowledged. The spread of both these diseases seems to be favoured by conditions of filth and overcrowding, and the existence of a filthy and sodden condition of the soil has been often spoken of in connexion with them. Nevertheless, there have been very few outbreaks of enteric fever in which the fact that cesspools, sewers, or underground middens have been in direct communication with the sources of water has not been detected. That typhoid fever poison can lurk in properly tilled ground seems very unlikely, and I am not aware that such a thing has ever been suggested.

Now, no organic impurity can possibly reach the soil from the subsoil, which is purely inorganic. Any organic impurity which reaches the ground water must, therefore, come from above, and is due in the vast majority of cases to our mismanagement of organic refuse. Of course if the soil of a city be porous, and if there be a subterranean network of sewers interspersed with cesspools, this would (in the high probability that an average proportion of these contrivances leak) constitute a very great danger, but we must not blame the earth because we mismanage it.

This world would not be habitable were it not for the humus

with which its bare rocks are clothed. The humus is the living covering of the skeleton, and its formation has taken ages. It is formed by the constant addition of dead organic matter which is deposited upon the surface. These additions of organic matter, be they in the form of dead animals, dead leaves, dung, or what not, become humified, and thus the stock of humus tends steadily to increase. The greater the stock of humus the greater the fertility, and the greater the fertility the greater will be the amount of dead organic matter to increase the stock of humus. The conversion of the dead organic matter into humus is a biological process and is caused by the animals which live in the humus and is perfected by the growth of fungi. If the humus be sterilised either by heat or antiseptics it becomes absolutely barren. The causes of the fertility of the soil are probably far more complex than we suppose.

The phenomenon of "symbiosis," or the living together of chlorophyll-bearing plants with those which have no chlorophyll in so-called symbiotic community where each partner works for its fellow's good as well as its own, is far more common than was supposed. It is stated that many plants only flourish in symbiotic community, and in this fact lies the explanation of the readiness of some plants to grow and flourish from cuttings put in sand, or from seedlings grown in nutritive solutions, while others, in the absence of the necessary fungi encircling their roots, cannot be made to strike root or flourish in this way. When it is stated that to the latter class belong oaks, beeches, firs, willows, poplars, rhododendrons, and heaths the importance of symbiosis in this world will be readily understood. Now we know why it is that the gardener prizes leaf-mould in spite of its being comparatively poor in nitrogen as compared with guano. Leaf-mould is full of fungi, and in it the plant readily establishes its requisite symbiosis.

In estimating the value of artificial manures the chemist's dictum is of the greatest value, but his analysis when used to gauge the value of the living humus may be entirely misleading. For the past ten years I have cultivated a garden of about an acre and a quarter in extent in which the only manure used has been the excremental and other refuse of some twenty cottages with about 100 inhabitants. The garden affords no evidence of being overdone with manure, and my belief is that it would take a great deal more. This ten years' experience has convinced me that human faeces constitute a manure of the greatest value, all analyses to the contrary notwithstanding.

Many recent experiences in sanitation and in medicine force upon us the conclusion that the value of chemical analysis in biological questions is not final. Water which has been found

to contain the bacillus of typhoid fever has passed the tests of the chemist. How different is the action of the carefully dried stomach of the calf in the form of rennet or pepsin as compared with a dish of tripe! These facts must force upon us the speculation that the same thing may produce very different effects according to the temperature to which it may have been artificially raised by drying under a vacuum or by cooking, and must drive us to the conclusion that although it may be advisable under certain circumstances to boil our milk or our water, it is possible that the act of cooking may change, we know not to what degree, the physiological action of the milk or water which has been thus treated. My experience tells me that the chemists are wrong when they say that human excreta are of small manurial value. Their analyses are doubtless right, but their conclusions are wrong and misleading.

The ultimate manurial value of urine is doubtless very great, although when pure or nearly pure it is very deadly to herbage. The only satisfactory way of using urine as a manure is to imitate the farmer by mixing it with an absorbent material such as straw, sawdust, peat, earth, paper, cotton waste, wool waste, &c., placing it upon the ground and digging or ploughing it in.

The best evidence that the humus is alive is the fact that decaying refuse generates heat, which is easily ascertained by using a thermometer.

The fact that the humification of organic matter generates heat is a fact which is of enormous practical value to the gardener and farmer. The market gardens round London, which produce astounding crops and assimilate an enormous quantity of dung, are, in a sense, extended and mild hotbeds.

That the humus breathes and generates an enormous quantity of carbonic acid precisely as an animal does is a fact which the agriculturist must ever bear in mind. Many of the operations of the farm have for their object the loosening of the soil and the admission of air to enable the respiratory processes to go on. Every farmer will tell you that the earlier he can get upon the ground to hoe his turnips the better will be the crop (other things being equal), and every farmer knows the advantage of thorough tillage. If the respiration of the humus is an important fact, it becomes very important indeed not to drown it. It stands drowning no better than a man does, but, like a man, it requires a requisite amount, but not too much, of drink. There can be no doubt that the failure which is almost general of so-called sewage farming arises through the drowning of the humus. There can be little doubt that the great trouble to the sewage farmer is the excess of water which drowns the humus. The evil effects of too much water have come before

re lately in two very striking examples. While going over the experimental farm belonging to Mr. H. C. Stephens, M.P., at Cholderton, on Salisbury Plain, there were here and there noticeable in the middle of the fields having a uniform quality of soil, and which had been treated in identical fashions, certain large patches over which the growth of turnips, as compared with the rest of the fields, was very defective. The explanation offered was that on these patches the animals had been folded in wet weather, that the dung had been trodden into the ground, and the soil had been hardened and consolidated by the trampling of the beasts. Under such conditions (air not being adequately admitted to the pores of the soil) the humification of the dung had been hindered and the crops stunted in consequence. The most fertile patch of the whole farm was where the cattle had been folded for a fortnight continuously on the same spot during the severe frost of last winter, and had been fed upon food which was necessarily brought to them on that spot. The ground being as hard as iron could not be more consolidated by trampling, and with the advent of the thaw there was a general disruption of soil and dung, and humification went on rapidly in earth of which the pores had been opened by the beneficent effects of a deep frost, and which had received an amount of dung which was exceptionally great.

Another experience was a visit to a sewage farm. The humus was drowned, and large tracts of the farm were as wet as a marsh, bore no crops, and never could be made to bear any under such conditions. As soon as it had been saturated it was ploughed up and saturated again, there being no time (let alone other considerations) to grow crops in face of the huge volumes of water which had to be dealt with. Those parts of the farm which were under cultivation grew enormous quantities of water-grass, a noxious weed, and altogether the agricultural aspects of this estate were as gloomy as could well be. As for the effluent, it was thick and turbid, and stunk like a dirty brewery. It was impossible to believe that the effluent had been rendered safe for discharge into a river, and its cost must have approached that of the beer which was sold in the adjoining town. The humification of excrement in the presence of such an overpowering amount of water is impossible. The purification of sewage is wrought by the presence of living organisms.

It is admitted that humus is one of the best filtering materials for water, and that water from a river full of living organisms is to a large extent freed from them by filtering through a few feet of the humus on its banks. In the past few



years Professor E. Frankland has shown that water of singular microbial purity has been obtained from the gravel beds which in places flank the Thames. Such water, one must suppose, is obtained from ground water which has fallen upon the earth, has filtered through it, and is slowly flowing towards the river. The purifying agent in these cases is mainly, one must suppose, the living humus which lies upon the surface, although the subsoil cannot be without some effect. These facts must alter our attitude towards surface wells, and must teach us—what to a great extent has been admitted—that the purity of surface wells must depend more upon the mode of construction and the surroundings of the well than upon its depth. Wells are polluted by foulness which has reached the subsoil without being subjected to the purifying influence of the humus, and there are many facts which go to show that if foul water gets to the under side of the humus without going through it, its purification in the subsoil is far from certain. The almost universal condemnation of surface wells and their frequent pollution are mainly due to the fact that we take our filthy and dangerous liquids through the humus in pipes, and thus ensure at great expense that it cannot be subjected to purification by it. If these underground pipes leak the mischief caused by pollution of wells may be very far-reaching. It is very probable that foul water continuously thrown on the same spot of ground may in time work its way to a well and thus pollute it. Such ground which is constantly soaked, be it remembered, is never tilled, because tillage is impossible. For ground to be tillable it is essential that reasonable breathing time should be allowed. I am not altogether sure (although I hardly dare to utter such a heresy) that a properly constructed surface well in a selected situation may not prove to be one of the safest sources for water, because it can be inspected with perfect ease, and the fact of accidental leakage into it would become apparent.

It may be well that I should describe precisely my method of dealing with excreta in my garden at Andover. My twenty cottages are provided with pails, except one which is provided with a "dry catch," and in time I hope to substitute the dry catch for the pails. It is a much better arrangement. The contents of the pails and dry catch are removed every day except Sunday, and as the distance to be travelled is very slight the time occupied is not more than an hour. This daily removal is very easy and, on sanitary grounds, it is most advisable. The pails are provided with covers, and they are moved two at a time by one man who is provided with a milkman's yoke. With "dry catches," a properly shaped shovel, and an iron vessel on wheels for transport, the removal

of the excreta from the twenty cottages to the garden could be effected in a much shorter time. In disposing of the excreta I follow nature. Under natural conditions the increase of the humus is effected solely by organic matter deposited on the surface. I therefore have the excreta merely covered by mould for decency's sake. The scavenger digs a furrow, as is done by a gardener when cultivating his land, the excreta are placed in the furrow and then covered up, and thus at one operation the land is tilled and the excreta disposed of. All foul smell is at an end the instant the excreta are covered. I believe that, when the excreta are thus covered with earth there is an end to any danger to health. In times of exceptional frost the excreta are mixed with ashes and stored until they can be inhumed. The great importance of this superficial burial must be insisted upon. It is the top of the soil which is most full of life. As regards microbial richness the first few inches are worth all the rest. It is the top of the soil which can destroy and assimilate organic matter; the subsoil has no such power. It is a common mistake to bury deeply any organic matter which seems to us to be particularly offensive. In this way we ensure its preservation and endanger the wells. The safety of our wells is directly proportionate to the thickness of the humus, and to place organic matter below the humus is like throwing the dog's bone beneath the kennel instead of into it. The inefficiency of deep burial hardly requires to be mentioned. Bodies buried deep in the subsoil last for years, while those which are placed in the living humus are rapidly destroyed.

After the excreta have been superficially buried plants of the cabbage tribe are dibbled in as soon as may be. This is often done within three days, and the cabbages are sure to flourish. Seeds do not flourish with any certainty, and, although I have seen fair crops of turnips, peas, onions, &c., when the weather has been favourable, such crops are liable to fail, while cabbage as a first crop is practically sure to succeed. I feel confident in stating that the plan I recommend is the best from the sanitary, agricultural, and financial points of view. Sanitarily it is the best because there is no delay in the safe bestowal of the excreta; agriculturally it is best because no ammonia or other volatile body is given to the air, but all goes to enrich the land; financially it is best because it involves moving the dung only once instead of twice, the same operation that tills the land and serves to cover the dung, and while the excreta are "opening" for other crops the farmer gets a crop of cabbage. For the cabbage crop the ground is still very rich and will grow everything or anything to which the soil and situation are well adapted in high perfection.

We may now profitably turn to the consideration of malaria, a disease which is undoubtedly connected with the soil, and which has its habitat in the soil of certain places. Malaria requires for its development decaying organic matter, a high or moderately high temperature, and usually an excess of moisture. Tropical marshes are the elected seats of malaria, but not the exclusive seats, for it is known that certain rocks and arid plains, as well as the sandy estuaries of rivers, are liable to be malarious. The one thing which all, or almost all, malarious districts have in common is the fact that they are barren, or nearly so, uncultivated, and in many cases uncultivable. Malaria is rare in England, but once it was common, and we must not forget that James I. and Cromwell are both of them said to have been victims of this disease, which was rife in London in their time, especially in the Essex marshes and on the south side of the Thames, in Lambeth Marsh and the adjoining districts. An undrained country is uncultivable, and it has been found that drainage followed by cultivation has in this country enormously lessened the amount of malarious disease. Cultivation of land finishes the work begun by artificial drainage. The soil is dried and aerated by tillage, and the organic matter, when the humus is no longer drowned, is oxidised and goes to nourish plants and trees which effect an upward drainage no less important than the downward drainage, while the oxygen exhaled by the green leaves cannot but benefit the air of the locality. If we wish to keep clear of malaria in this country we must till the soil and so nourish the humus that its produce may be sufficiently valuable to bear the expense of any artificial drainage which it may be necessary to maintain. If the land of this country goes out of cultivation, as in places it seems to be doing, I see no reason why we or our successors should not witness a recrudescence of malarious disease in localities which are prone to develop it.

The cultivation of the soil and the nurturing of the humus have important bearings upon questions other than food-supply, and if we continue to starve the humus and to convey our filth beneath it instead of upon it, I fear that the cost of living in this country is likely to increase, while the pleasures of existence will diminish.

The moral of all that I have been saying is to the effect that to nourish the humus and to till it are the inexorable duty of the sanitarian. This simple duty is the key to plentiful food and a good supply of wholesome water.

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### 3.—*M. Tisserand on Agriculture.\**

I AM pleased to see that at this Exhibition a place has been found for Poultry. Poultry are too much neglected in France; on farms they are mostly disdained, while the breeding of the better varieties is considered an occupation for amateurs. This is an error, poultry could be made an important source of revenue to the farmer and of benefit to the farm. Not only have we an immense market for them in the interior, but at our ports we have an almost unlimited outlet both for eggs and birds. England imports each year more than 110 millions of francs (4,000,000*l.*) worth of eggs and poultry, and we are only able to send her 12 million francs worth, while from Italy trains laden solely with this same merchandise traverse the whole length of France to reach the English market. This market should belong to us, we being the nearer. I might say the same for the exports of fruit and vegetables which Normandy so easily produces.

Normandy is truly a happy country. It is admirably adapted for agriculture; crops grow there remarkably, healthy and clear waters abound, the air is pure and vivifying, and the rural population intelligent. On account of these favourable circumstances the cultivators of Normandy ought to make great progress. In no country is horse-breeding so prosperous, nor is there one which furnishes such good horses for general use. Cattle breeding has increased since the war of 1870, the number having risen by 100,000 head or more.

The production of milk has increased during the same period from 9,030,000 hectolitres to 10,870,000 hectolitres; the increase during the last ten years alone has been over 800,000 hectolitres. The amount produced in Normandy is equivalent to one-eighth that of the whole of France. Dairy produce has also improved, thanks to the improvement in dairy utensils and the good methods spread by our exhibitions, our schools, and our Professors of Agriculture.

The circle of your export trade is spreading on all sides, and your cattle are to be seen in the centre and in the east of France. They meet them also on the shores of the St. Lawrence, and in the Plata, even in Australia, such success should be gratifying to you. But I would not have you believe that you are now entitled to rest on your laurels and do nothing. It would render you, indeed, poor service should I leave you with this impression. Normandy is even yet far from having

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*\* Taken from a speech made at an Agricultural Meeting in Normandy.*

reached the limit of improvement which she might easily realise.

When I find myself in Normandy, I am always reminded of that small country Denmark, whose land possesses almost as great advantages for cultivation, and whose population belongs to the same race as the Normans. Denmark, like Normandy, enjoys a magnificent climate in summer, but not nearly so good an one during the other seasons of the year, yet it possesses nearly 1,700,000 head of cattle (500,000 more than Normandy), and 1,000,000 milking cows, and exports 100,000,000 francs worth of butter. Normandy, on the other hand, has only 550,000 cows, and deducting the imports, the whole of France exports only 40 to 50 million francs worth of butter. Denmark nourishes annually with its milk by-products 411,000 pigs. Normandy only 332,000.

How has Denmark accomplished this remarkable development? It is by bestowing care on the perfecting of its cattle, from the two points of view of symmetry and milking capacity. It has created a Herd Book in which no animal is entered until it is proved of pure breed and has been tested. Every animal which is not perfect in form, and which does not possess good milking qualities, is rigorously excluded from breeding, consequently from generation to generation the faults are vanishing, the milking qualities increasing, and inferior animals are becoming more and more rare, while those of good quality are multiplying. The Danish cultivators, on the other hand, are impressed with the idea that the essential condition of improvement, without which the best methods of selection only prove slow and inefficient, consists in varied, substantial, and regular feeding, to obtain which they have not only modified the forage crops, but they manure them thoroughly, thus making the forage more abundant and more nourishing. Having ascertained that the meadows and pastures, if manured with superphosphate of lime, furnish not only more abundant nourishment but such as enables the cows to produce milk much richer in butter, they import to-day large quantities of this manure and apply it to their pastures. They also use bran and oil-cake to increase their cattle-food resources. In this way their beasts at all seasons, and at every age, receive sufficient nourishment, substantial and varied.

Having in this way secured plenty of milk, they have done their best to improve its quality, for in the market of the world it is quality which is demanded, and which alone proves remunerative. The ordinary commodity is at a discount. They have considerably improved their butter and cheese, have transformed their appliances, have formed co-operative societies, and

by sterilising their milk, which renders it unalterable, have made it possible to export it longer distances; lastly, they have succeeded in utilising a great portion of the bye-products and waste of the dairy, and thereon fatten a large number of pigs.

By following the example of the Danes, the Normans can arrive at similar results. Imitate them with care, nourish carefully and regularly your animals, consider always that if to feed them well is costly, to feed them badly is still more so.

Attend to their nourishment, particularly while they are young, for it is upon their careful nourishment at this period of life that their powers of assimilation and of production depend.

Manure well your land, spread over all pastures phosphate of lime, and you will increase at once your nutritive resources and the quality of your forage. But it is not everything to have sufficient forage, it is necessary to utilise it properly. What an immense quantity of food is lost, which, if well employed, would enable a larger number of animals to be reared! By realising this progress, you will increase your production of milk, butter, and cheese, and you will improve their quality.

And now permit me to raise my voice against the unjust attacks which have been directed against your butter. I have heard it said, and have read, that the butter of Normandy has become so bad, so impure, that on the London market it has lost its old reputation. Nothing is less true. According to official documents published in London, I see every month that Normandy butter stands side by side with the best butter of Cork, of the Low Countries, of Finland, of Germany, of Australia, of New Zealand, and even of Denmark.

This, however, does not prove that all the butters of Normandy are of the first quality. If Normandy possesses advantages which in no part of the world can be equalled, she nevertheless produces sometimes very ordinary butter not easy of preservation. This result is due to absence of care and of good methods. The farmers of Normandy can make, when they will, butter of the first quality, quite as good as the best English butter. They must have recourse to the best methods, must show more care and cleanliness in the manufacture of the butter, and must also improve their premises and their utensils.

Efforts have already been made towards this end, but they have been timid—perhaps too timid. More must be done—hesitation is not permissible to-day in face of the certain disadvantages which will accrue from it.

Let us work then. If the difficulties are great, do not be discouraged, have faith in the future. Work—work without ceasing. It is by working on quietly, unceasingly, that you will

acquire and preserve superiority over others. The aid and encouragement of the State you have already, but it lies with you to protect yourselves by sustained and energetic efforts towards progress.

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4.—*The Value of Green Food for Pigs.* By JOHN BARRON.

My experience of the value of green food for pigs is rather that of a breeder than a feeder, as I seldom fatten more than is just sufficient for home consumption. Of all food-producing animals, the pig comes the nearest to the human being in the great diversity of food which he takes. We all know how necessary a certain proportion of fresh vegetables is in our own diet if we wish to keep in perfect health, and how even dogs and other carnivorous animals will eat grass if at all ailing. I therefore make it a rule that all my pigs shall have a certain proportion of green food every day, when obtainable.

Of course, the easiest and cheapest method of attaining this is to allow them to run out in a grass field for a certain length of time each day. This should always be done with breeding pigs, as such require exercise, as well as green food.

During the summer, my breeding sows are out the whole day, and thrive exceedingly well on what they pick up, with the addition of a small ration morning and night of bran or coarse sharps, often mixed with a few brewers' grains. Young pigs should only remain out for quite a short time each day, and should never be allowed out in the hot sun.

After weaning, they may be allowed to remain out for an hour or two, according to the weather, but if it is desired to grow them on quickly, it is not advisable to let them remain out too long.

Of all green fodder fed to pigs in yards or styes, I consider vetches the best. I have kept a yard of pigs, from four to eight months old, in a healthy growing condition for two months at a time on very little else but green vetches. When very young and succulent they should be fed to small pigs rather sparingly, or they will be apt to scour.

Green clover and lucerne, or, in fact, any green crop that is relished by cattle, may be given to pigs with advantage.

Every pig-keeper knows the value of surplus garden produce. In early spring, when this is scarce, a few raw mangolds will be found a capital substitute. I generally contrive to keep a few of these well into the summer, as I find them very beneficial, even when green fodder is plentiful. Prickly comfrey

another capital fodder plant. It comes in very early, and is a most excellent tonic and blood purifier. Being a deeply-rooted plant it is independent of weather and climate, and grows more rapidly and luxuriantly than any other green soiling plant, producing in a given space a far greater quantity of forage than any crop grown. In the driest and hottest seasons it will afford several heavy cuttings, when all other vegetation is either burnt up or at a standstill.

If a small patch of ground can be spared near the piggery it will pay well to plant it with prickly comfrey. The ground should be forked or ploughed deeply, and well manured at the same time. The crowns or root cuttings are then planted like potato sets, thirty inches between the drills. The plants should be fifteen inches apart, or, say, 14,500 sets per acre. When it has grown to the height of about 18 inches it should be cut over and used, as it is better not to allow it to grow too tall or to flower. In winter, the roots ought to be dressed with ordinary manure or sewage. The ground should be kept clean the first year, afterwards the plants will take care of themselves, and, with a little manure now and then, will furnish an inexhaustible supply of food from early spring to late autumn. It is hardly necessary to say that it is very wasteful to give pigs more green food at one time than they will clean up, or they will trample upon and destroy far more than they will eat.

At the present time (20th November), in addition to surplus green stuff from the garden I am giving my pigs a daily ration of ox-cabbage either raw or steamed. I fancy few of your readers outside this district know the enormous value of Drumhead ox-cabbage as a fodder plant of all kinds of cattle, but especially for milk cows. At any rate I have never seen it grown so extensively, nor with such satisfactory results, as it is in the district of South Derbyshire. Sixty to seventy tons per acre is not at all an uncommon crop. We plant the young plants out a yard apart in May and commence to use them in October, and unless we get a severe frost they last well into January. A moderate amount of frost is not injurious, but it is wise to give either cattle or pigs cabbage whilst the frost is on. *Farmer and Stock-Breeder Year Book.*



## The Farmer's Library.

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### NOTES AND REVIEWS OF NEW BOOKS.

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—*The Journal of the Royal Agricultural Society of England.*  
Vol. VI. John Murray. London.

THIS Society's bulky Journal contains as usual a number of valuable articles upon various subjects connected with the many phases of agriculture; but to only a few of these will it be possible to draw attention. Professor Brown contributes three articles—one on "Glanders," another on "Ring-worm of Calves," and a third on "Sheep-Scab in its relation to Sheep Husbandry."

In the article upon Glanders—a disease which is produced by a well-known microbe or bacillus—he refers to the value of mallein, which is prepared from cultures of the glanders bacillus, or *Bacillus mallei*, as a means of detecting the presence of the disease, and he considers that the effectiveness of this test has been placed beyond all question. He shows how untenable is the supposition, which seems to be more or less prevalent, that the use of mallein is liable to produce glanders. To use his own words:—

"Mallein, if properly prepared, is absolutely clear from any suspicion of the bacillus of glanders. It may therefore be safely concluded that the injection of any quantity into the system of a healthy animal cannot induce glanders."

"The Feeding of Animals" is elaborately and scientifically treated by Sir J. Lawes and Sir H. Gilbert, in a joint paper which does not admit of condensation. Nor can the results arrived at be profitably stated without further explanation of the reasons than the space available permits; but the subject is of such universal importance, that we feel justified in quoting at length the principal conclusion arrived at as summarised by the authors.

"The amount of food consumed, both for a given live-weight of animal within a given time, and for the production of a given amount of increase, is, as our current food-stuffs go, measurable more by the amounts they contain of digestible and available non-nitrogenous constituents than by the amounts of the digestible and available nitrogenous constituents they supply.

"That this should be the case, so far as the consumption for a given live-weight within a given time is concerned, seems consistent enough when the prominence of the respiratory function in the maintenance of the body, and the large requirement for non-nitrogenous constituents of food to meet the expenditure by respiration, are borne in mind. But, at first sight, it seems less intelligible that the quantities consumed to produce a given amount of increase in live-weight, should also be much more dependent on the supplies of the non-nitrogenous, than on those of the nitrogenous constituents of food.

"It has been shown, however, that store animals may contain as much, or even more, of the non-nitrogenous substance—fat—than of nitrogenous substance; whilst the bodies of fattened animals may contain two, three, four, or more times as much dry fat as dry nitrogenous matter. Obviously, therefore, the proportion of fat to nitrogenous substance in the increase in live-weight of the fattening animal, must be much higher than in the entire bodies of the animals.

"Then, it has been further shown, that the non-nitrogenous substance of the increase—the fat—is at any rate in great part, if not entirely, derived from the non-nitrogenous constituents of the food.

"Of the nitrogenous compounds of food, on the other hand, only a small proportion of the whole consumed is finally stored up in the increase of the animal. In other words, a very large amount of nitrogen passes through the body, beyond that which is finally retained in the increase, and so remains for manure.

"It is, therefore, only what should be expected, that the amount of food consumed to produce a given amount of increase in live-weight, as well as that required for the maintenance of a given live-weight for a given time, should, provided the food be not abnormally deficient in nitrogenous substance, be characteristically dependent on its supplies of digestible and available non-nitrogenous constituents.

Again it has been shown that, in the exercise of force,

there is a greatly increased expenditure of the non-nitrogenous constituents of food, but little, if any, of the nitrogenous.

"For maintenance, for increase, and for the exercise force, the exigencies of the system are characterised more by the demand for the digestible non-nitrogenous or more specially respiratory and fat-forming constituents, than that for the nitrogenous or more specially flesh-forming ones."

A well-illustrated paper on the "Reserve Materials of Plant" contributed by Professor Green.

Professor McFadyean treats of the "Prevention of Tuberculosis in Cattle." He points out how

"a tuberculous animal is a sort of hotbed for the propagation of the tubercle bacillus, and wherever such an animal exists it is a source of danger to other animals by reason of the bacilli which may be voided from its body. There are various ways in which the bacilli bred in the interior of an animal may gain access to the outer world. When the lungs are the seat of the disease the germs are expelled by the act of coughing; when the udder is diseased they are drawn off with the milk; when the bowel is diseased they are passed out with the dung; and when the disease is located in the kidneys, or the generative organs, they may be voided with the urine, or in the discharges from the genital passages.

"It is obvious that tubercle bacilli passed out in any of these ways may speedily gain access to the body of another animal, and thus start a new case of the disease."

The remedy which he suggests is that which has been for three years put into practice on a large experimental farm. Professor Bang, the veterinary adviser to the Danish Government, which method is now being encouraged rather than forced in Denmark. These measures consist mainly in separating the healthy animals from the diseased, the former being discovered by means of the tuberculin test. The diseased animals are to be kept carefully disinfected, and to have separate attendants. The milk they yield must be heated to 85° (85° Fahr.), and no calves are to be reared unless, by the tuberculin test, they have been ascertained to be free from tuberculosis.

Of the Reports and shorter contributions to the Journal, of Mr. Carruthers upon the "Seeds, more especially Gr

Seeds, which are sold in some of the Market Towns of England," is of special value, as indicating how inferior and adulterated these seeds are, and what an enormous amount of money must be wasted by farmers in their purchase. Thus, for example, of mixtures of seeds sold for permanent pasture, the best sample contained 86 germinating seeds out of every 100, while the worst sample contained only 30 germinating seeds. Of the best sample, 79 per cent. were good pasture plants: 21 per cent. plants of second quality. In the worst sample, only 19 per cent. of the germinating seeds were good pasture plants, 69 per cent. were of second quality, and 12 per cent. were inferior and weed-seeds.

## 2.—*The Journal of the British Dairy Farmers Association.*

IN this Journal, among the several subjects of interest treated, notice may be specially drawn to an article by Mr. John Speir on the important question of "the air of cow-houses." Having shown how very varying are the County Councils' Regulations with regard to air space in byres in Scotland, he attempts to determine the requisite air space for cattle, and as a guide quotes the following table from a lecture by Professor Roscoe on "Ventilation in Schools."

|                                       | Cubic Space<br>per Head. | Authority.              |
|---------------------------------------|--------------------------|-------------------------|
|                                       | Feet.                    |                         |
| Board Schools' minimum for infants .. | 80                       | Educational Department. |
| Graded Schools' minimum .. .. .       | 117                      | London School Board.    |
| General Schools .. .. .               | 130                      | " "                     |
| Dundee School Board, average .. ..    | 152                      | " "                     |
| Non-textile workrooms .. .. .         | 250                      | Factory Act.            |
| Lodging-house sleeping-rooms .. ..    | 300                      | Local Government Board. |
| British Army barracks, minimum ..     | 600                      | Army Regulations.       |
| Prisons, seldom under .. .. .         | 750 to 800               | Park's "Hygiene."       |
| Army horses, minimum .. .. .          | 1,600                    | Army Regulations.       |
| " " in infirmary .. .. .              | 1,900                    | " "                     |

Taking these figures as a guide, and working on the assumption that "all animals require a supply of air very much in accordance with their weight," he comes to the conclusion that "where animals occupy a building continuously, anything that can be gained in purity of air by a very large building seems infinitesimal in proportion to the cost incurred." He then enters very fully into the results of a number of observations

rich he has made, and of estimations of the amount of carbonic acid gas present in cow-houses and other places, and from the figures thus obtained comes to the following conclusions:—

“If, while in the house, cattle are to be supplied with air approaching in purity that of fresh air, our farm buildings must be very differently constructed from what they are at present. When, however, it comes to stating what degree of purity is necessary to keep them in good health, opinions vary so much that we have really nothing definite to guide us. It stands, however, to reason that the nearer we can make their conditions of life approach that of living in the fields in summer, the nearer are we likely to approach our ideal. If to keep our breeding and milking stocks healthy it is necessary that they should be supplied with air of the purity demanded by sanitarians, we must either keep them too cold to be healthy or profitable, or we must heat our buildings. For many years the conviction has been forced on my mind that, at least in the winter production of milk, it might pay to heat the air of byres up to something like summer heat, as we would thereby be enabled to give sufficient fresh air to ensure good health, while the heat might allow the cows to produce extra milk on a lessened quantity of food sufficient to pay for the coal consumed, and interest on the outlay. With fattening cattle the difference in gain between animals kept at, say, 60° Fahr. and 45° or 50° Fahr., is not so marked as with cows in milk, yet there is a difference; but whether or not it is such as might reasonably be expected to pay for the outlay incurred is at present unknown to me.”

Mr. A. D. Hall contributes a paper on “Foreign Dairy Education,” showing the lines along which development is taking place abroad. He points out that the great change still in progress is mainly due to the introduction of the factory system, which, while it produces the demand for men of a certain type and with certain educational qualifications, also provides the means of educating such men, the Dairy Schools being as a rule connected with a factory.

Such, for example, is the Dairy School of the East Prussian Dairy Union. Here six pupils are taken at a time for a six-months' course, which mainly consists of practical work in the dairy, &c., but also includes an hour's instruction daily in the caring and feeding of cows. They have further the opportunity of learning book-keeping, and, for three months, of going daily to the laboratory for practice in milk-testing. The cost of the whole course, board, lodging, and tuition, comes to about £10;

the pupils must be at least twenty years of age, and must have had previous practical experience of dairy work.

A second class of students, "Hospitanten," board and lodge themselves in the village of Tappian; they receive instruction in the work of the factory, but all practical work is voluntary, it being understood, however, that they must carry through punctually and in order any such work which they undertake. They receive an hour's lecture each day, and in the course of six months these lectures cover the whole ground of dairy management, particular attention being paid to technical book-keeping. Professor Fleischmann also gives them a weekly lecture. Students of this kind may enter at any time and stay as long as they like; they pay 25s. a month, increased to £2 if they also work in the chemical laboratory.

Every year in August, a short course is held for young farmers, agents, &c.; a daily lecture is given either by Professor Fleischmann or the resident instructor, who takes also a laboratory class daily. The former takes the students round the estate and shows them the system of cropping and feeding; in addition, there is a weekly excursion, conducted by Professor Fleischmann, to some farm in the neighbourhood. For this summer course students pay £2, boarding and lodging themselves in the neighbourhood.

At the farm school proper, where the aim is to turn out housewives and dairymaids, the instruction is entirely practical, and in the hands of the wife of the farmer. The girls take part in the whole of the farm work, and live as part of the family. They receive in this way practical instruction in dairying, cattle-feeding, gardening, fruit-drying, &c., and take a share in all the housekeeping work that is going on. The girls are supposed to come for a year, and they pay £15 in advance for the whole of their instruction, board, lodging, &c., but some may be admitted for a shorter time at a fee of £2 a month.

Perhaps the most admirable feature in the management of these Schools is the way in which efficiency and cheapness are secured by the system of attaching the School to an already existing farm or factory respectively.

There are several other articles in the Journal, as also a report by Mr. Ernest Mathews upon the Milking Trials and Butter Tests held by the Society, which contains much matter

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3.—*Farm Foods*. By Professor EMIL VON WOLFF. Translated by H. H. COUSINS, M.A. Oxon. London: Gurney and Jackson.

WHEN in 1874 Professor Wolff first published his now celebrated book on the Rational Feeding of Farm Stock, he concluded his preface with these words, which we take from the present translation :—

“To all farmers and practical men who are trying to feed their farm animals on a rational and economical system I dedicate this book, and it also suggests itself as a suitable text-book for the instruction of the coming generation of practical farmers who are studying at Agricultural Colleges. Most earnestly do I hope that its contents, scope, and form may enable it not only to arouse general interest in the subject, but that the practical application of its teaching may result in great advances in this important branch of the Economy of the Farm.”

The author's hopes were realised, for not only did the work arouse general interest, but it became at once recognised as the standard work on the subject, and has since passed through six editions. It is the translation of the sixth edition which is now presented to the English farmer in his own language. As Mr. Cousins in his preface states :—

“It is significant of the inefficient way in which England has approached the problem of applying science to agriculture, that such an epoch-making book as this should have been allowed to remain inaccessible to the farming community for twenty years, and to pass through six editions in its native German, without finding a translator, or even evoking a feeble imitation, in this country.”

Yet it is not so much the fault of those who knew the work that it has not been previously translated, but probably rather because no firm could be found in England to publish a translation: for the sale of works on Agricultural Science is notoriously limited and unprofitable. Nevertheless, there have been many writers on agricultural matters in England who have used Professor Wolff's work as the basis of their writings upon the feeding of live stock, so that even if the work itself has not been translated its contents have become familiar to the agricultural world, while many have studied the main principles of the subject in the American Manual of Cattle Feeding by Professor Armsby, which is largely based upon Wolff's work.

Another reason why the agricultural public do not read so much in England as they might with advantage, may perhaps be found in the high price at which works on agriculture are published. This very book, for example, is procurable in the original German for half-a-crown, while the English translation costs several times as much. It is, nevertheless, well worth the money to every farmer or feeder of live stock, and in many cases the saving of food which a careful adoption of scientific principles in feeding would ensure would, in one day, more than repay the cost of the book.

We have compared the translation with the original sixth edition, and though, in a few instances, we find verbal errors, such, for example, as the word "chylus" translated "lymph" (page 12 *et seq.*), where it should be "chyle," yet on the whole the translator has done his work well, except that here and there, from an attempt to abbreviate, the finer sense of the original is partly lost. However, these few blemishes do not detract from the great value of this translation of Wolff's work. We wish the translator had more fully appreciated the habit of German authors who, when they utilise the work of others in their own writings, give the credit of the work to those who did it. Thus, on page 24, the work of Henneburg is quoted, and Wolff acknowledges the author, which the translator omits to do. In England, unfortunately, too many writers make their reputation by quoting the works of others without mentioning the source of their information, and so obtain for themselves the credit of this stolen work.

The book is divided into three parts. The first treats of the General Laws of Animal Nutrition, the second of the Food of Farm Animals, and the third of the Feeding of Farm Animals. And in the Appendix are six tables of the utmost value to the stock feeder.

There are few, if any, questions connected with the feeding of stock upon which advice cannot be found in this volume. Some might think that, being the work of a profound German scholar, it would be written in language not easily understood. This is not the case, and the translator has wisely followed the simplicity of the original, as will be seen from the following extracts taken from the reports on the production of force:—

It is generally believed, in accordance with Liebig's teaching, that mechanical work and continued activity of the muscles is attended in a considerable wear and tear of the system, and produced a double or even treble consumption of albumin. Since then researches by Voit and Voit-Kofoer at Munich have shown that this is not the



case, but that with a constant supply of food, or even without food, the consumption of albumin in the body is no greater under conditions of muscular exercise than those of perfect rest, provided the animal be in fair condition, the exercise not too violent, and its duration not too protracted. Although the non-nitrogenous food-stuffs, *i.e.* fats and carbohydrates, as well as the albuminoids, contribute towards the production of force, still the latter have special functions to fulfil, and a certain quantity plays a highly important part in the vital processes of the body."

"Many observations justify the conclusion that the albuminoids are capable of producing and making possible the production of force in the body. No one expects much work from men or animals fed on a diet poor in nitrogen, such as potatoes and rice.

"Fatness of body is never considered a sign of muscular strength.

"A dog fed largely on bread and fat is lazy and sleepy, while one fed on a full supply of meat is brisk and able to do hard work. A horse in hard work is given plenty of oats every day, and sometimes the highly nitrogenous food beans in addition."

"The lively temperament of the carnivora in contrast to the dull and phlegmatic attitude of herbivora appears to be largely due to the difference in diet."

"Only by a high bodily condition, a high diet of nitrogenous food, and a resulting intensity of digestion is it possible to generate sufficient energy for the production of extreme and protracted muscular exercise. Feeble folk and convalescents cannot perform as much work with the same food as powerful labourers with fully developed muscles; the former must gradually recover strength by good food and exercise before they can produce their full maximum of work.

"But, since the muscular activity increases the requirements of respiration, a large supply of non-nitrogenous food is required for this purpose.

"A highly liberal diet is absolutely necessary to preserve the flesh and fat in the body, and at the same time to keep it in a powerful condition. An addition of fat, which is the most intense respiration material is often a desirable addition and nearly as important as albumen; and it is a suggestive fact that the working classes have a decided taste for fatty dishes, and that oats—a food proportionately rich in fat—are recognised as an excellent food for horses."

The above quotation is a fair example of the practice which subjects are handled. We welcome this translation as one of the most celebrated agricultural works in the world, and it will put within the reach of all farmers knowledge, of which is already recognised by the best feeders of the

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4.—*Through the Stable and Saddle-Room and The Farrier*  
Major A. T. FISHER. London: Richard Bentley and

IN the first of these works the author treats at length of the stable, its situation, ventilation, and accessories; the harness and general equipment of the horse; the food of the horse; and the diseases of the horse. The work is written in a clear and interesting style, and the opening especially that dealing with the ventilation of stable, can be consulted with advantage, by those who purpose to build or alter stables. In treating of bedding materials the author seems to object to moss litter because it stops the drains, but surely there is a very simple cure for this, namely to wash the drains before putting moss litter down, as no dirt is required.

As an illustration of the style in which the book is written, and the nature of the advice given, we cannot do better than quote the following passages upon the "Ben-Morgan"

"Ben Morgan, who for many years was huntsman at Pytchley (and no better ever carried a horn), invented a bit which bears his name, and a very excellent one, especially for horses which pull or carry their heads high, or for horses whose heads are badly, or high, or on. It is, to all appearances, when on, like an ordinary bit, but the mouthpiece, instead of having a port, is perfectly round and smooth, and is made in a slice from cheek to cheek, with the curve lying directed towards the horse's teeth—like what is called a lunge bit, only reversed. As the mouthpiece is low in the mouth in the centre only, it therefore bears on the tongue, and, moreover, prevents a horse from getting his head to the hand, as he, trying to reach it, plays on it, and his head to the hand of the rider. It is perfect and simple in its action, and does not cut or hurt the horse's mouth, inasmuch as it obtains by, as they say, cajolery what cannot be secured by force. It is

that, in order to obtain the full advantage of its action, the curb-chain should be as slack as it reasonably can be.

"I have used it myself, and can vouch for its good qualities, and was enabled by its use to hunt with the most perfect comfort a horse which I could not hold with any other bit, and whose mouth was as hard as a paving-stone. I can also answer for its good qualities as a driving-bit.

"One St. Leger meeting I chanced to come across an old school-fellow who, like myself, was also driving his regimental coach, and we fell to talking over coaching matters. I knew his team (which, by the way, were as good a lot of horses as could be got together) were a bit hard-mouthed, and wondered that he, having met with a severe accident to his left arm, could hold them; and then he told me that he always used 'Ben Morgan' bits on the pullers, and advised me to get one for our headstrong wheeler. I followed his advice, and discarded all the former instruments of torture, and from that time forward was able to drive in comfort. I may also add that I have for some years past used it on a pony which I have, and which I bought as being quite impossible to hold; and she was quite so, until I ordered a 'Ben Morgan' bit for her. Since then she has given me no trouble, and a child can drive her with the most perfect ease."

The second book is a small and useful manual on the art of oeing horses, written in a clear style and containing thoroughly and instruction. Considerable interest being now taken in oeing, since the institution of travelling farriery schools under county Councils—such for example as the school conducted by this Society for the county of Somerset—the book is of especial value at the present time. And as we think its careful study would considerably assist in the educational work referred to, we shall quote freely from it, and at some length, in order to show fully the nature of its contents.

On the subject of lameness in horses, the author truly says:—

"Without the full and perfect use of its feet a horse is useless. If any one of the four feet with which the animal is provided sustains any injury, lameness must necessarily be the result. The animal is unsound for the time being; it is lame; and let me here remark that it is lame because it is in pain. There is no gainsaying this fact. It is one which no amount of argument or sophistry can overcome.

"Lameness for the most part is due to bad shoeing.

"Cart-horses, especially those in use on farms, are generally most shamefully neglected in this respect."

The subject matter is divided into three sections. 1st. The foot of the horse. 2nd. The shoe. 3rd. The diseases to which the foot of the horse is liable, their treatment, etc.

As regards the first of these we read :—

“An intending purchaser of a horse, when making his examination of the animal, should commence with a close inspection of the feet, for if these are not good, then, no matter how perfect the animal may be in other respects, it becomes a mere waste of time to further prosecute the inquiry.”

Then follows a chapter on the construction of the foot and the bones of the foot. Next the fixing of the shoe to the foot is considered, and many useful suggestions are made. We extract the few following sentences as illustrations of the contents of this chapter.

“Before fitting a horseshoe to the foot of the animal for which it is intended, it becomes necessary to prepare the foot for its reception. This preparation, if properly performed, is an excessively simple operation. Nothing further is requisite than to remove the superfluous growth of the crust, and this is best effected by means of the rasp.

“It is not only unnecessary, but most detrimental to the sole, which, as I have explained, is never very thick, to remove one atom more of it than is loose and ready to come away without the use of the knife.

“In like manner the bars, which so admirably serve to strengthen the foot, must not be pared or touched with a knife, but left intact to perform the duties assigned to them.

“The frog requires to be very tenderly and carefully treated, and nothing further than the removal of rugged portions is admissible.”

Passing over a chapter on shoes we come to one in which among other things the author treats of horse-shoe nails. And here we may remark that unfortunately few smiths are now taught to make nails, though we are informed that in the army smith has still to qualify in nail-making. The following is a description of what a nail should be :—

A good nail should be pliant, and yet well nigh unbreakable by fair means; it should, when fixed not too tightly in an iron vice, admit of being fully bent backwards and forwards some five or six times at least. In shape it should be fine flat and sufficiently long, slightly increasing

in size at the belly, and again gradually tapering off to a fine and even point. This increase in width serves to give it a firm hold when it has been driven. The head should gradually decrease in size as the neck is approached; it should be square at the top and of such a length as corresponds with the thickness of the shoe, so that when it is driven home the hole made for its reception should be very exactly filled by it. More or less than this will not suffice."

A chapter is devoted to the Charlier system of shoeing, which is, in the opinion of many judges, without doubt, the best and most natural system, but, as country smiths know nothing of it, if a Charlier shoe is cast it cannot be replaced at the nearest smith's, and this is probably the reason why this shoe has not come into more general use.

As in the former book so also in this, the diseases of horses are considered, though here more concisely in the necessarily limited space at the disposal of the author. We can recommend both these books to those members who are interested in horses.

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#### 5.—TEXT BOOKS OF AGRICULTURE.

1. "*The Soil, its Nature, Relations, and Fundamental Principles of Management.*" By F. H. KING, Wisconsin. London: Macmillan and Co.
2. "*Agriculture.*" By R. H. WALLACE. London: W. and R. Chambers.
3. "*Agriculture, Practical and Scientific.*" By Prof. JAMES MUIR. London: Macmillan and Co.

WE have considered these three books together, and they admirably illustrate how great is the progress in agricultural science which is being made in America as compared with that made in England.

Professor Bailey, of Cornell University, had for many years conceived the idea of an authoritative series of readable monographs which should treat every rural problem in the light of the undying principles and concepts upon which it rests. As he says, "it is fit that such a series should be introduced by a discussion of the soil from which everything ultimately derives its being." Hence the origin of this little work by Professor King on the Soil. In the Preface which Professor Bailey has written thereto he truly says:

"Agriculture has developed into a system of clear and correct thinking, and every man's habit of thought is determined greatly by the accuracy of his knowledge."

His criticism of the present rural literature as being "too often wooden in its style," though it may be intended to apply to America, is none the less true of many English works on agriculture. Of the book before us, however, this cannot be said.

The aim of the author has been :—

"to use so much of recorded facts as shall sufficiently enforce those principles underlying the management of soils which it is needful to understand in order that a rational practice may follow."

For some years past American chemists have been turning their attention to the study of soils and their properties by methods which have not been followed in England, but which seem to throw valuable light upon many of the problems connected with the physics of the soil.

To some of this work, more especially that of Professor Whitney, attention has been drawn in former numbers of this 'Journal.' Soil texture, both from a mechanical and also from a chemical point of view, therefore, receives full attention. Chapters V. and VI., which are devoted to the consideration of Soil Water, are two of the most interesting in the work, more especially perhaps on account of the full treatment of the subject therein, as contrasted with its neglect in the other works under review. Diagrams are used to illustrate such subjects as the influence of the rise and fall in the barometer upon the soil water, which rises and falls simultaneously. In Chapter VIII., Soil Warmth is treated, and such an instructive fact as that when the temperature of the air rises the temperature of the soil falls, is admirably shown by means of diagrams. The influence of this natural loss upon the cultivation of the soil is not overlooked, and the work is one of the best contributions to agricultural literature that we have seen for some time. Should the other numbers of the series, of which this is the first, prove of the same worth, they ought to be appreciated by those for whom they are written, and will meet a want that has been long felt.

Mr. Wallace's book is profusely illustrated, and evidently written to serve as a text book for those who are studying to pass the examination in agriculture of the Department of Science and Art.

... protest against this work and that of Professor

Muir being entitled "Agriculture," considering that they deal only with the soil and its treatment for the growth of crops, while the very important department of agriculture which has reference to the management and feeding of live stock and the industries which result therefrom are not treated.

Professor Muir, however, recognises that his title "in its widest sense" should include these subjects, and it is to be regretted that he did not give his book some such title as "The Soil and Crops of the Farm." These are the subjects of which he treats; the first half of the book being devoted to the soil and its amelioration by means of manures or implements, the second to the study of crops. It is this second half which will give the book its claim upon agricultural readers. It contains, in fact, a carefully prepared condensation of our knowledge of the best methods of treating the crops of the farm, and few who study it can fail to gather valuable information from its pages.

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6.—*The Animal Tuberculoses.* By ED. NOCARD. Translated by H. SCURFIELD, M.D. London: Baillière, Tindall, & Cox.

THERE are few subjects to which more attention has been paid of late than that of tuberculosis, and the more it is studied the more it will be realised that the subject has, up to the present, been far too much neglected. This disease in human beings is more commonly known as consumption. Professor Nocard shows it to be prevalent in cattle, pigs, horses, small ruminants, the dog, cat, and birds. To its presence in each of these a chapter is devoted. It would have been well if some of those who have recently written in the agricultural press upon tuberculosis had first studied the subject in such a work as that of Dr. Nocard. The farmer who wishes to know something reliable about this disease, which is so prevalent among the cattle of this country, might with advantage study this work, even though it is written in a scientific manner, as indeed the subject demanded, so that those who would read it must be prepared for some technical terms. It is essentially a work more suitable for the veterinary surgeon than for the farmer. To the former it is indeed indispensable. But those who cannot follow all the technical terms will find in it much that is of interest and value. For instance, looking at the subject from the point of view of the consumer of milk, it is satisfactory to learn that the tubercle bacilli seldom find their way into the milk, and then only when a cow is suffering from tuberculosis of the udder. Professor Nocard writes: "In my

experience I have never found the milk virulent when the udder was free from tuberculous lesions, and tuberculosis of the udder is comparatively rare ; for out of fifty-four cows which had been seized for general tuberculosis, which I studied especially with this object in view, only three had tuberculosis of the udder."

"At Copenhagen the proportion is still lower, and Bang estimates it at less than 3 per cent. of the number of tuberculous cows."

However, if, as seems evident, it is possible for milk at any time to convey the tubercle bacillus from the cow to the human being, it is evident that precautions should be taken to prevent such a calamity, and fortunately such precautions are not difficult to carry out. "The temperature of 85° C. prolonged for five minutes kills all the bacilli;" hence, says Professor Nocard, "to avoid all danger, it is sufficient to bring the milk to the boil before it is consumed."

In an Appendix, the translator describes Professor Bang's scheme, referred to on page 237 of this volume, in the notice of the R. A. S. E. Journal.

## 7.—HORTICULTURE.

1. "*Greenhouse and Window Plants.*" By CHARLES COLLINS. London : Macmillan & Co.
2. "*Garden Flowers and Plants.*" By J. WRIGHT. London : Macmillan & Co.
3. "*The Horticulturist's Rule-Book.*" By L. H. BAILEY. London : Macmillan & Co.

THE first two of the above-named works belong to the admirable series of primers which are issued by Messrs. Macmillan ; the third is an American book, but is brought out by the same publishers. The primers are intended for amateurs, and are both well illustrated and thoroughly practical. Mr. Collins commences with some hints on the construction of greenhouses, some simple rules follow for their heating and general management, and the appliances and materials required are briefly described. There is next a brief summary of the methods of propagating plants, and of their subsequent care, from which many useful hints may be gained.

The various plants suitable for culture in a greenhouse are systematically and alphabetically described, being divided into groups, so that separate chapters are devoted to "Spring and Summer flowering plants," "Autumn and Winter flowering plants," and "Bulbous and tuberous-rooted plants." But this



es not exhaust the contents of the primer, and there are few plants grown in greenhouses which do not receive some attention. Mr. Wright's book is a companion volume, and treats in a similarly systematic way of the hardy annuals, bulbs, tubers, and budding plants, which do not require a greenhouse for their cultivation.

These inexpensive little primers ought to be in the hands of every one who has a small greenhouse or garden, and is anxious to make the most of it. Not only are they suitable for the cottager, but also for the very large number of work-people who, dwelling in the vicinity of towns, have yet enough garden to either afford pleasure or become an eyesore. We knew a gentleman who, having daily to drive to a station past long rows of cottages, was so depressed by the want of any tempt on the part of the occupants to make the most of these few yards of garden, that he offered prizes for the best gardens and window-gardening on the road to the station. This induced some of the occupants to try what might be done with so little space, and, with some advice from the prizegiver's gardener, they soon succeeded; others followed the example, and that road to the station became in time a much pleasanter drive. There are hundreds who might follow the example of these cottagers, and, with the help of these primers, the task would be made comparatively easy.

The last of these three books is entirely different in scope and character. It is intended for those who already possess a knowledge of horticulture, but who want a reliable book of reference to which to turn for the many out-of-the-way facts only occasionally needed. Thus, it contains formulæ for most of the known insecticides; descriptions of injurious insects classified under the names of the plants which they infest; a similar classified list of plant diseases. Then follow a series of tables for computing seeds, for planting out, and other operations. Methods of keeping, storing, collecting, and preserving fruits, &c., are given, and much information of a statistical nature likely to be found of use to the horticulturist. The information which is not of a statistical nature is brief and to the point, as will be seen from the following quotation, which being on a subject of universal interest may prove useful to our readers:—

#### WATERING GREENHOUSE AND WINDOW PLANTS.

“Plants cannot be satisfactorily watered just so many times a day, week, or month. All plants should be watered when necessary—when they are dry. This is indicated by a tendency to flag or wilt, or by the hollow sound of the pots when tapped. The latter is the safest sign, as, after a

prolonged period of dull weather, many plants wilt on exposure to bright sunshine, although still wet at the roots. But a growing plant should not be allowed to become so dry as to wilt, nor should the soil ever reach a condition as dry as powder. This is a condition, however, which is essential to some plants, more particularly the bulbous and tuberous kinds, during their resting period. Incessant dribbling should be avoided; water thoroughly and be done with it until the plants are again dry. Plants under glass should not be sprayed overhead while the sun is shining hot and full upon them. The evening is the best time of the day for watering in summer, and morning in winter. In watering with liquid manure, the material should not come in contact with the foliage. Plants recently potted should not be watered heavily at the roots for a week or ten days; spray them frequently overhead."

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8.—*Milk, its Nature and Composition.* By C. M. AIKMAN, M.A., D.Sc. London: Adam and Charles Black.

IN every quarter of the civilised world milk and its products have, of late years, received considerable attention from scientific men. The results of their investigations are, however, for the most part hidden among journals which are not accessible to the ordinary reader. Hence it was wise to issue a work at a sufficiently small cost to place it within the reach of the many young women and others interested in dairying, yet one which would supply them with accurate information. The aim of the author, as he states in his preface, is, "to give a short popular statement of the more important facts of the Chemistry and Bacteriology of Milk." There can be no doubt that he has succeeded in this, and has treated the subject in such a way as to make it easily understood by those who will take the trouble to read carefully.

Many will wish that some of the subjects could have been dealt with more in detail, but the book would then, of necessity, have been suitable for the few only, rather than for the many. The work commences with a study of the structure of the cow's udder, and the secretion of milk, and to assist in explaining these details the author has had recourse to the admirable illustrations of Fürstenberg, some of which were used in Vol. I. of this 'Journal' for the same purpose in 1890.

The composition and constituents of milk next receive attention, and are followed by a careful treatment of the conditions which influence the production and quality of milk.

We are pleased to see that the author steers clear of the two extreme and erroneous views which are so frequently set forth by writers on this subject, some of whom proclaim that food has no influence on the quality of milk, while others, in the endeavour to prove that food has an influence upon the quality, seem to overlook the many other causes which are also at work to this end.

The typical forms of bacteria are illustrated, and the action of different bacteria on milk is popularly described.

Butter, rennet, and cheese are briefly considered, more especially from a bacteriological point of view. Chapters on the testing of milk, and milk as a food, are also included in this little work, which we can recommend to those who wish to gain a further insight into the mysteries of the nature and inhabitants of milk and its products.

9.—*Injurious Insects. Report of Observations during the Year 1895.* By Miss E. A. ORMEROD. London: Simpkin, Marshall and Co.

PERSISTENT study is the only certain means of attaining mastery of any subject, and those who devote themselves to it deserve well of mankind, inasmuch as they help to increase our knowledge, and make us better able to fight the battles of life. How much, then, do we not owe to Miss Ormerod who not only has devoted a life's work to the elucidation of a subject of ever-recurring importance, but has given freely to the store of knowledge thus gathered to those whom it would benefit. In all her works scientific accuracy is combined with practical utility in a rare degree; entomologists cannot study them without admiring the simple yet efficient descriptions, and the admirable illustrations by which they are accompanied, while to the farmer whose crops are attacked by insect pests they afford sound practical advice of infinite value.

The Nineteenth Annual Report of the agricultural entomological work done by our greatest authority testifies to increasing rather than diminishing activity on her part, for the benefit of the agricultural community.

The Report may be divided into three parts: the first treats of attacks of injurious insects on such farm crops as beans, turnips, cabbages, mangolds, corn, and grass; on fruit such as the apple, gooseberry, plum and strawberry; and on orchard and other fruit trees, etc. The second part is devoted to flies injurious to horses, cattle, etc.; and the third to ticks.

One point very strikingly brought out by Miss Ormerod

this Report has certainly upset what we had long cherished as an agreeable belief, and one which we think is more or less generally taken for granted, viz., that the frost during a severe winter like that of 1894-95 destroys insect pests. To quote the author's own words:—

“So far as I can judge from reports sent to myself during 1895, I should certainly say that in no case was there evidence to show that presence of insect infestation was lessened by the severe cold of the early part of the year. The appearance of some of the crop or fruit infestations was retarded until they were thawed into active life in their lurking-places, or the surface of the ground was sufficiently softened to allow them freedom, but beyond this I did not find any *direct* effect on insect presence from the cold. *Indirect* effect there certainly was, but this tending to *increase* the amount of insects, or of their injury, from various causes; as, for instance, sowing of spring corn being retarded, and the young plant consequently not having time to get ahead before the season of attack of its maggot pests; or, again, as in Forfarshire, where the severe weather and accompanying gales are even now bearing fruit in the quantities of Pine Beetles (*Hylurgus piniperda*) to which the broken and fallen Pine-boughs and timber afforded nurseries.”

We cannot read this without feeling regret at having to give up a belief that at least afforded some consolation during the extreme cold of the winter, and we shall look forward to next year's Report with considerable interest, to discover whether or not the extremely mild winter of 1895-96 is followed by a greater number of insect pests than usual. Under any circumstances we would recommend all our readers to be prepared to meet any such trouble by studying the works of Miss Ormerod, and, failing the necessary information there, to seek it direct from the authoress.

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THE HORSE AND HIS UTILISATION. By W. B. TEGETMEIER  
LONDON: HORACE COX.

SWAKEN'S HORSE BOOKS ON HORSES AND THEIR UTILISATION  
WE HAVE HAD SOME OF THIS NUMBER ABOUT ONE-HALF HAVE  
BEEN SOLD IN GREAT BRITAIN.

THE KNOWLEDGE HAS, HOWEVER, BEEN GAINED BY RECENT TRA-  
VELLING RESPECTING THE HISTORY AND HABITS OF SPECIES HITHERTO  
UNKNOWN AND, ABOVE ALL, A VAST AMOUNT OF INFORMATION

as been accumulated, proving the advantages that are found to arise from utilising the mule in almost all civilised countries except England, in which country no book on this useful hybrid has until now ever been published. To supply this deficiency, and to demonstrate the great value and economy of the mule as a beast of draught and burden, that could be as advantageously employed in this country in agricultural and general draught purposes as it is by other nations, and by ourselves in all military operations abroad, is in part the object with which this work is published. As indicating the value of mules, we are informed that in one small district in France nearly 50,000 mules are bred annually, and command a much higher price than horses of corresponding character. For the purpose of military transport, thousands of mules are purchased annually by the Indian Government, and in the United States of America the greater part of the agricultural work is performed by these animals, which are found to be more advantageous for general purposes than horses. The neglect of the mule in England is due to the prevalent ignorance respecting its character and extreme utility.

The work has been published in order to afford information on this subject, and to demonstrate that in France, Spain, Italy, the United States, and the East, the mule is regarded as an indispensable animal, as it is always acknowledged to be in military service. The work may be regarded as not only of a zoological, but also of a practical character. It is admirably illustrated, and cannot fail to prove of interest and advantage to breeders of horses and mules.

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11.—*Dairy Bacteriology*. By ED. VON FREUDENREICH. Translated by J. R. AINSWORTH DAVIS. London: Methuen and Co.

THIS is a short popular manual for the use of students in dairy schools, cheese-makers and farmers, setting forth the main facts of bacteriology in so far as they affect the dairy industry. Dr. Freudenreich, who is Director of the Bacteriological Laboratory of the Rütli Dairy School, Berne, is one of the first authorities in Europe on bacteriological subjects, and this little work has been translated into many languages, showing that it has supplied a want and supplied it well. The great advantage of the book is that the information it contains comes to us direct from an original worker and a master of the science of bacteriology. We can therefore rely upon the accuracy of the facts stated, and also upon obtaining the latest information upon the subjects treated. We have not merely read it, but have con-

stantly used it in its original German since it was published in 1893. The present edition has been brought up to date, and is in every way a work which we can recommend to those who are studying the science of dairying.

### 12.—*Illustrations of Horticulture.*

WE have received from Messrs. W. and A. K. Johnstone, of Edinburgh and London, a series of diagrams by Alfred Cooper and C. Orchard, compiled chiefly for the purpose of assisting the teaching of horticulture in elementary schools, and in the technical classes established under County Councils, etc. The series as sent consists of ten admirably-executed coloured diagrams, mounted on cloth with rollers, but they can be obtained on cloth to fold up.

We believe in education by means of observation, and from observation in the class-room to observation in the field is but a short step and one likely to be taken. Hence, it is better, as being more successful, to train this faculty in the class-room first, and then to induce and cultivate its application out-of-doors. But these diagrams would do more. On each is letter-press, containing valuable information on the subject of which the diagram treats, giving brief explanations as to the right method of cultivation, and drawing attention to the wrong methods so frequently adopted from want of experience or proper training. The ten diagrams of this series treat of the apple and pear, and how to train and graft these and other tree-fruits. There are also diagrams relating to the gooseberry, strawberry, and raspberry. We should like to see these diagrams hanging on the walls of every rural school, especially in districts where cider is made. Attention has recently been drawn in the 'Gardener's Magazine' to the terrible state of neglect in which many English orchards are to be found. To teach those who are interested in orchards how they should be kept, would be the surest means of bringing out the much-to-be-desired improvement; and we are not deterred with, nor can we think of, any means which would be more likely to secure this end than the use of these diagrams, more especially the six which have reference to the apple and pear, throughout the rural schools of apple-growing districts. The series on horticulture is only one of many sets of practical subject lessons published by Messrs. Johnstone, several of which are of an agricultural character. They only need to be known to ensure their being utilised for educational purposes.

# Bath and West and Southern Counties Society.

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## TAUNTON MEETING, 1895.

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### JUDGES.

#### HORSES.

**Shire.**—W. H. AUSTIN, Deddington, Oxon.

**Other than Shire.**—W. JONAS, Highfield, Daxford, Cambridge.

**Hunters, Hacks, Ponies, and Harness.**—J. S. DARBELL, West Ayton, near Scarborough.

#### CATTLE.

**Devon.**—H. QUARTLEY, Molland, South Molton; H. SIMMONS, Bearwood Farm, Wokingham.

**Shorthorn.**—J. WEBB, Melton Ross, Barnet-by-Junction, Lincoln; R. L. ANGAS, Estate Office, Blenheim, Woodstock.

**Hereford.**—J. P. TERRY, Berry Field, Aylesbury.

**Sussex.**—W. WOOD, Ifield Court, Crawley.

**Jersey.**—W. ASHCROFT, Layhams, Hayes, Beckenham, Kent; J. R. FISK, Brightstone, Isle of Wight.

**Jersey Butter Test.**—E. MATTHEWS, Chequer's Mead, Potter's Bar, Herts.

**Guernsey.**—A. DUNLOP, Church Farm, Hendon, N.W.

**Guernsey Butter Test.**—G. T. BARHAM, College Farm, Finchley.

**Aberdeen Angus.**—J. P. TERRY, Berry Field, Aylesbury.

**Kerry and Dexter.**—G. F. ROMIEU, Willey Park, Farnham, Surrey.

#### SHEEP.

**Leicester.**—B. PAINTER, Burley-on-the-Hill, Oakham.

**Cotswold.**—W. T. GARNE, Aldsworth, Northleach, Glos.

**Devon.**—W. STEVENS, Budlake, Broadclyst, Exeter.

**Southdown.**—F. M. JONAS, Chrishall Grange, near Royston.

**Hampshire Down.**—J. M. FRIEND, Kimpton, Andover, Hants.

**Shropshire.**—P. A. EVANS, Sherlowe, Wellington, Salop.

**Oxford Down.**—J. BRYAN, jun., Southleigh, Witney, Oxon.

**Horned.**—E. G. LEGG, Melpash, Dorset; W. H. VELLACOTT, Stone, Exford, Taunton.

#### POULTRY.

J. HARWOOD, Fore Street, Tiverton, Devon; W. B. TEGETMEIER, North Finchley, London.

## PRODUCE.

**Cheese, Butter, and Cream.**—G. BUTCHER, Bath; A. T. LORAM, Cathedral Dairy Co., Exeter; JUBAL WEBB, Brookville, 3, Phillimore Gardens, Kensington, W.

**Cider.**—F. J. HAYES, West Pennard, Glastonbury.

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## COMPETITIONS.

## BUTTER-MAKING.

PROF. CARROLL, Royal Albert Farm, Glasnevin, Dublin; T. RIGBY, Sutton Weaver, *viâ* Warrington, Cheshire.

## HORSE-SHOEING.

A. WHEATLEY, F.R.C.V.S., Reading; F. W. WRAGG, F.R.C.V.S., 17, Church Lane, Whitechapel, London, E.

## MILKING.

J. C. LOCK, Saltford, Bristol.

## SHEEP-SHEARING.

J. D. ALLEN, Springfield House, Shepton Mallet.

## DAIRY APPLIANCE.

Dr. J. A. VOELCKER, M.A., B.Sc., &c., 20, Upper Phillimore Gardens, Kensington, London, W.

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## PRIZE AWARDS, 1895.

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\* \* An animal designated in this list as the "reserve number" is entitled, *conditionally*, to succeed to any prize that may become vacant in its class by reason of the animal placed above it by the Judges failing afterwards to qualify.

† Animals, where not otherwise stated, may be considered to have been bred by the Exhibitor.

ABBREVIATIONS EXPLAINED:—S., sire; d., dam; s. of d., sire of dam; y., year; m., month; w., week; d., day; R., Reserve; V.H.C., Very Highly Commended; H.C., Highly Commended; C., Commended.

All ages calculated to May 29, 1895.

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### HORSES.

#### FOR AGRICULTURAL PURPOSES.—SHIRE.

(Eligible for the Shire Horse Society's Stud Book.)

##### CLASS 1.—*Shire Stallion, foaled before 1893.* [5 entries.]

**I. (£20.)**—T. CHAPMAN, Orchard Portman, Taunton, bay, **Orchard Willow** (13,415), 5 y., 3 w., bred by J. W. Luddington, Littleport, Ely, Cambs.; s., Hatherton (4443); d., Willow Lady (vol. v.); s. of d., King Tom (1274).

**II. (£10.)**—W. WOODS, Warnford Park, Bishop's Waltham, bay, **Willingham Tom** (12,665), bred by — Theoday, Cambridgeshire; s., Tom (2156); d., Dainty; s. of d., Bay Archer (2389).

**R.**—D. S. CARR, Draycott, Weston-super-Mare, black, **Prime Spark** (3955), 12 y., bred by J. Frankham, Canfield, Dunmow; s., Spark (2497); d., Bloss (vol. vi. p. 180).

##### CLASS 2.—*Shire Stallion, foaled in 1893.* [6 entries.]

**I. (£15.)**—N. COOK, Chevithorne, Tiverton, bay, 2 y., 1 m.; s., Prince of Orange; d., Diamond II.; s. of d., Naughty Tom.

**II. (£10.)**—T. CHAPMAN, Orchard Portman, Taunton, bay, **Orchard Portman** (15,275), 2 y., 3 w.; s., Prince William (3956); d., Orchard Brown (vol. xii. 10,613); s. of d., Lincolnshire Tom (1367).

**III. (£5.)**—Sir W. GILBEY, Bart., Elsenham Hall, Essex, bay, **Saxon Oak**, 2 y.; s., Mars Victor (9889); d., Rokeby Rhoda (13,296); s. of d., Ruler III. (6353).

**R. & H. C.**—H. F. LOCKE KING, Brooklands, Weybridge, black brown, white markings, **Cedric R.**, 2 y.; s., British Flag III. (12,841); d., Moonlight (vol. xii.); s. of d., Moonbeam (4580).

**C.**—S. BURDGE, Weare, near Axbridge, brown, **Weare Champion**, 1 y., 10 m., 2 w.; s., Black Champion II. (10,933); d., Smart (vol. xiv. 5610); s. of d., Elinglish Pride (vol. vi. 3632).

iv *Prizes awarded to Horses for Agricultural Purposes.*

CLASS 3.—*Shire Colt, foaled in 1894.* [6 entries.]

**I. (£15).**—LORD LLANGATTOCK, The Hendre, Monmouth, bay, **Hendre Harold**, 1 y.; s., Harold (3703); s. of d., Draughtsman.

**II. (£10).**—J. BLYTH, Blythwood, Stansted, Essex, bay, **Blythwood Conquest**, 1 y., 1 m., 3 w., 2 d.; s., Hitchin Conqueror (4458); d., Blythwood Bountiful (11,607); s. of d., Harold (3703).

**III. (£5).**—G. COWING, Yatesbury, Calne, grey, **Yatesbury King** (vol. xvii.), 1 y., 1 m., bred by — Poulson, Ridge Farm, Corsham; s., Rampton Taffy (12,141); d., Dora; s. of d., The Pope.

**R. C.**—J. BUCKNELL, Cannington, Bridgwater, bay, **King Charming II**, 1 y., bred by Mrs. A. Foster, Hanbury Park, Burton; s., King Charming (3166); s. of d., Candidate (2405).

CLASS 4.—*Shire Mare and Foal, or in-Foal.* [8 entries.]

**I. (£20).**—LORD LLANGATTOCK, The Hendre, Monmouth, roan, **Dunsmore Fashion II**, 8 y., in-foal, bred by R. Capes, Meathop, Grange-over-Sands; s., Vulcan (4145); d., Kit (664); s. of d., Champion (440).

**II. (£10).**—J. BLYTH, Blythwood, Stansted, Essex, bay, **Tudor Rose** (15,842), 4 y., in-foal, bred by Sir W. Gilbey, Bart., Elsenham Hall, Essex; s., Hitchin Conqueror (4458); d., Olinda (10,606); s. of d., Royal Albert (1885).

**III. (£5).**—P. STUBS, Blaisdon, Newnham, Gloucestershire, bay, **Depper** (14,556), 5 y., in-foal, bred by C. Brooks, Cold Harbour, Hartwell, Aylesbury, s., Thorney Tom (3370); d., Depper (14,555); s. of d., Britain (264).

**R.**—J. WILLIAMS, Regilbury Park, Winford, Bristol, bay, **Regilbury Flower** (647), 5 y., 9 m., 3 w.; s., Mormon (2847); d., Regilbury Brown (313); with foal.

CLASS 5.—*Shire Filly or Gelding, foaled in 1892.* [8 entries.]

**I. (£10), Gold Medal (value £10),\* and Champion (£10).†**—Sir W. GILBEY, Bart., Elsenham Hall, Essex, grey mare, **Dunsmore Dora** (16,582), 3 y., bred by P. A. Muntz, M.P., Dunsmore, Rugby; s., Royal II. (8107); d., Star (13,519); s. of d., Regent II. (6316).

**II. (£5).**—LORD ROTHSCHILD, Tring Park, Herts, black filly, **Windley Lilly** (19,129), 3 y., bred by W. G. Burrows, Windley Hall, Derby; s., Marmion II. (9885); d., Choice (6044); s. of d., Charter (3740).

**II. (£3).**—B. J. BUCKNELL, Holcombe Barton, Wellington, Somerset, bay filly, **Holcombe Gem**, 3 y.; s., Juvena (9684); d., Holcombe Blossom; s., Matchless Ma'c.

**III. (£1).**—LORD LLANGATTOCK, The Hendre, Monmouth, bay filly, **Scapton Princess**, 3 y., bred by Mrs. S. Moseley, Weston-on-Trent, Derbyshire; s., Chancellor (4959); d., Trimmer; s. of d., Royal George II. (2485).

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\* Awarded by the Shire Horse Society for best Mare or Filly in Class 4, 5, 6, subject to Special Condition stated in Prize Sheet.

† Given by the Trinton Local Committee for Best Filly or Gelding in Class 5 or 6.

**CLASS 6.—Shire Filly or Gelding, foaled in 1893. [8 entries.]**

**I. (£10).**—Sir W. GILBEY, Bart., Elsenham Hall, Essex, bay mare, **Madge** (18,525), 2 y., bred by H. C. Holland, Marchington Hall, Uttoxeter; s., Harold (3703); d., Marchington Heroine (10,402); s. of d., Premier (2646).

**II. (£5).**—LORD ROTHSCHILD, Tring Park, Herts, black filly, **Princess May**, 2 y., bred by G. Cox, Elmton Park, Chesterfield; s., Bar None (2388); d., Violet (13,713); s. of d., Don John (3596).

**III. (£3).**—LORD LLANGATTOCK, The Hendre, Monmouth, bay filly, **Hendre Wedding Bells**, 1 y., 10 m.; s., Dunson Forest King (13,019); d., Hendre Bridesmaid; s. of d., Maharajah (3207).

**R.**—G. L. FOSTER HARTER, Puckrup Hall, Tewkesbury, bay filly, **Dunsmore Edith**, 1 y., 11 m., bred by P. A. Muntz, M.P., Dunsmore, Rugby; s., Dunsmore Bounding Willow (13,013); d., Dunsmore Violet (6229); s. of d., Napoleon (1604).

**CLASS 7.—Shire Filly or Gelding, foaled in 1894. [8 entries.]**

**I. (£10).**—B. J. BUCKNELL, Holcombe Barton, Wellington, Somerset, brown filly, **Holcome Primrose**, 1 y., 1 m., 2 w.; s., Juverna (9684); d., Blyth Sylvia; s. of d., Chimney Prince (11,220).

**II. (£5).**—Sir W. GILBEY, Bart., Elsenham Hall, Essex, brown, **Rokeby Hostess**, 1 y., bred by J. Parnell, Rugby; s., Harold (3703); d., Crenton Hasty (6071); s. of d., Black Prince (2989).

**III. (£3).**—LORD ROTHSCHILD, Tring Park, Herts, chestnut filly, **Grace Darling**, 1 y., bred by G. Cox, Elmton Park, Chesterfield; s., Honest Tom (5123); d., Elmton Graceful (vol. xiii.); s. of d., Bar None (2388).

**R.**—A. BOWERMAN, Capton, Williton, Somerset, dark bay mare, 1 y.; s., Prince of Orange (8055); d., Violet; s. of d., Powerful Shire.

**OTHER THAN SHIRE.**

**CLASS 8.—Mare and Foal, or in-Foal. [3 entries.]**

**I. (£20).**—LORDS A. and L. CECIL, Orchardmains, Tonbridge, bay Clydesdale, **Cynthia** (11,252), 7 y.; s., Claymore (3522); d., Darling (1093); s. of d., Topsman (886); with foal by Prince Eddie (9637).

**II. (£10).**—Miss E. C. TALBOT, Margam Park, Port Talbot, brown Clydesdale, **Carissima**, 6 y., 2 m., 1 w., bred by Lords A. and L. Cecil; s., Claymore (3522); d., Darling (1093); s. of d., Topsman (886); with foal by Montrave Major (9623).

**CLASS 9.—Filly or Gelding, foaled in 1892. [5 entries.]**

**I. (£10), and Champion (£10).\***—LORDS A. and L. CECIL, Orchardmains, Tonbridge, bay Clydesdale filly, **Christmas Chime**, 2 y., 11 m., 3 w.; s., Claymore (3522); d., Campanella (4480); s. of d., Druid (1120).

**II. (£5).**—J. BUTT, Lower Farm, Lympham, Weston-super-Mare, bay filly, **Pleasant**, 3 y., 2 w.; s., Black Champion II. (vol. xv. 10,933); d., Smart.

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\* Given by the Taunton Local Committee for Best Filly Colt or Gelding in Class 9, 10, or 11.

**R.**—**LORD FITZHARDINGE**, Berkeley Castle, Berkeley, bay Clydesdale filly, **Bell of Berkeley**, 3 y., 1 m.; s., Prince of Berkeley (8149); d., Nell (11,328); s. of d., Lord Kelso (2966).

**CLASS 10.—Filly or Gelding, foaled in 1893. [9 entries.]**

**I. (£10.)**—**L. DEADMAN**, Brockampton, Havant, bay filly, **Blue Bell**, 2 y., 1 w., bred by — Bronwich, Daventry.

**II. (£5.)**—**LORDS A. and L. CECIL**, Orchardmains, Tonbridge, black brown filly, **Crown Imperial**, 2 y., 1 m.; s., Crown of Royalty (9177); d., Cynthia (11,252); s. of d., Claymore (3522).

**III. (£3.)**—**MISS E. C. TALBOT**, Margam Park, Port Talbot, dark brown, **Margam Queen**, 2 y., 1 m., 2 w.; s., Crown of Royalty; d., Carillon; s. of d., Claymore.

**R.**—**T. L. WALKER**, Knightwick Manor, Worcester, brown gelding, **Knightwick**, 2 y., bred by W. Nott, Collington, Bromyard; s., Shaftesbury (10,390).

**CLASS 11.—Filly, Colt, or Gelding, foaled in 1894. [5 entries.]**

**I. (£10.)**—**MISS E. C. TALBOT**, Margam Park, Port Talbot, bay Clydesdale colt, **Margam Boy**, 1 y., 2 w.; s., Tullyallon; d., Carillon; s. of d., Claymore.

**II. (£5.)**—**LORD FITZHARDINGE**, Berkeley Castle, Berkeley, bay Clydesdale filly, **Lady Lily**, 1 y., 1 m., 2 w.; s., Prince of Berkeley (8149); d., Lily of Berkeley (11,329); s. of d., Stonehenge (4039).

**R.**—**J. BUCKNELL**, Cannington, Bridgwater, bay filly, **Cannington Blossom**, 1 y., bred by W. H. Smith, Ambergate; s., Carlton Banker.

**ANY BREED.**

**CLASS 12.—Cart Mare of any Age, the Property of a Resident in Somerset. First Prize, 7l.—Second Prize, 5l.**

[No Award.]

(The Prizes in Class 12 were offered by the Somerset Agricultural Association.)

**HUNTERS.**

**CLASS 13.—Hunter Mare and Foal, or in-Foal. [8 entries.]**

**I. (£20.)**—**HOLT and HOLT NEEDHAM**, Castle Cary, Somerset, bay, **Craft**, 9 y., bred by Captain Fife; s., King Crafty; d., Good 'un (130); s. of d., with foal by Yard Arm.

**II. (£10), and Gold Medal.\***—**L. W. G. HENSHAW**, The Manor House, Caudle, Sherborne, chestnut, **Diana**, 9 y.; s., Ben Battle; with foal by Marioni.

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\* Given by the Hunters' Improvement Society, a Gold Medal, or a Bronze Medal, and 5l., for the Best Hunter Brood Mare, registered in the Record of Hunter Mares and Sires in Class 13, in-Foal to, or with Foal at Foot by, a Hunter Mare, and a Registered Hunter-Sire, subject to conditions stated in the Rules.

**III. (£5.)**—A. M. FRY, 8, Cambridge Park, Redland, Bristol, chestnut, **Halma**, aged; with foal by Marioni.

**R.**—HOLT and HOLT NEEDHAM, chestnut, **Ruby**, aged; with foal by Life-boat.

**C.**—V. P. CALMADY, Tetcott, Holsworthy, chestnut, **Puritan**, 7 y.; s., Huguenot; d., Ruby; s. of d., Koh-i-Nor; with foal by Chevron d'Or.

**CLASS 14.—Hunter Mare or Gelding, foaled in 1891. [9 entries.]**

**I. (£20.)**—T. BRADLEY, Uffington, Stamford, Lincolnshire, brown mare, **Stella**, 4 y., 2 w.; s., Havoc; d., Sally.

**II. (£10.)**—H. W. THOMAS, Kingsbridge, Devon, bay gelding, **Huntsman**, 4 y.

**III. (£5.)**—F. W. GRESWOLDE-WILLIAMS, Thorney Cottage, Knightwick, Worcester, bay gelding, **Thorney**, 3 y., 11 m., 2 w., bred by — Pope, Lullesley, Worcester; s., Munchausen; d., Restless; s. of d., Foxhunter.

**R.**—V. P. CALMADY, Tetcott, Holsworthy, chestnut mare, **Stolen Pearls**, 4 y., 3 w., 5 d.; s., Chevron d'Or; d., Ruby; s. of d., Koh-i-Nor.

**CLASS 15.—Hunter Filly or Gelding, foaled in 1892. [8 entries.]**

**I. (£15.)**—T. BRADLEY, Uffington, Stamford, Lincolnshire, brown gelding, **Sultan**, 3 y., 1 m., 2 w.; s., Havoc; d., Sally.

**II. (£5.)**—J. HOLMES, Ledbury, Herefordshire, brown filly, **Sweetheart**, 3 y., bred by W. Scott, Aldborough, Boroughbridge; s., Napsbury; d., Souvenir; s. of d., Baron Cavendish.

**III. (£3.)**—F. W. GRESWOLDE-WILLIAMS, Thorney Cottage, Knightwick, Worcester, bay mare, **Eleanor**, 3 y., bred by W. Muzzem, Douthwaite Lodge, Kirbymoorside; s., Spendthrift; d., Madam; s. of d., George Osbaldeston.

**R.**—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, brown mare, **Mandoline**, 3 y., bred by J. Lemon, Smemington, Tawstock; s., Freshwater; s. of d., Messenger.

**V. H. C.**—F. W. GRESWOLDE-WILLIAMS, brown gelding, **Enthusiast**, 3 y., bred by J. Brain, Syddington, Cirencester; s., Zeal; d., Welsher.

**CLASS 16.—Hunter Filly or Gelding, foaled in 1893. [8 entries.]**

**I. (£15.)**—T. BRADLEY, Uffington, Stamford, Lincolnshire, brown filly, **Sequence**, 2 y., 1 m., 2 w.; s., Havoc; d., Sally.

**II. (£5.)**—C. E. WOODS, Alderley Grange, Gloucester, bay filly, **Wolverine**, 2 y., bred by — Bayes, Foxholes, Canton, Yorkshire; s., Young Omen.

**III. (£3.)**—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, brown filly, **Nightingale**, 2 y., 2 w., bred by A. V. Sherrin, High Ham, near Langport; s., Lancastrian; d., Ruby.

**R.**—HOLT and HOLT NEEDHAM, roan filly, **Moonlight**, 1 y., 11 m., 3 w., bred by W. D. Holt, Castle Cary; s., Snowdown; d., Lady Grey (773. H.I.S.); s. of d., Flying Comet.

**CLASS 17.—*Hunter Filly, Colt or Gelding, foaled in 1894.***

[8 entries.]

**I. (£15.)**—T. BRADLEY, Uffington, Stamford, Lincolnshire, bay colt, **Sequel**, 1 y., 3 w.; s., Havoc; d., Sally.

**II. (£5.)**—J. H. LARGE, Crudwell, Malmesbury, chestnut filly, 11 m., 1 w., 2 d.; s., Tom Cribb; s. of d., Victor.

**III. (£3.)**—J. H. LARGE, bay filly, 1 y., 2 w., bred by — Knight, Doughton, Tetbury, Gloucester; s., Zeal.

**R.**—HOLT and HOLT NEEDHAM, Castle Cary, Somerset, chestnut filly, **Rocket**, 1 y., 1 m., 3 w., bred by J. H. Miller, Osborne, Sherborne; s., Life-boat; d., Midnight (H.I.S. Gold Medal); s. of d., Ruddigore.

**HACKS.****CLASS 18.—*Hack Mare or Gelding, over 14 hands.*** [2 entries.]

**I. (£10.)**—H. W. THOMAS, Kingsbridge, Devon, bay gelding, **Candida**, 5 y.

**II. (£5.)**—E. S. GODSELL, Stroud, Gloucester, brown gelding, **Lord Sefton**, 6 y.

**CLASS 19.—*Hack Mare or Gelding, not over 14 hands.*** [7 entries.]

**I. (£10.)**—J. WHITE, Taunton, skewbald mare, **Miss Wentworth**, aged.

**II. (£5.)**—A. S. DAY, Berkeley Stud, near Crewe, brown, **Magic**, 7 y.

**III. (£3.)**—W. S. FORSTER, Gore Court, Maidstone, brown mare, **Queenie**, 4 y., 11 m., 1 w., bred by W. Haymes, Exmouth; s., Troubadour; d., Bedworth.

**R.**—A. MASON, North Hill, Swansea, chestnut mare, **Lady Gladys**, 8 y., bred by W. Walters, Mayals, near Swansea; s., Flying Buck.

**PONIES.****CLASS 20.—*Pony Mare or Gelding, not over 14·1 hands, suitable for Polo, 4 years old or over.*** [5 entries.]

**I. (£10.)**—F. W. GRESWOLDE-WILLIAMS, Thorney Cottage, Knightwick, Worcester, black mare, **Satinella**, 8 y.

**II. (£5.)**—J. HAWKINS, Bristol Road, Bridgwater, chestnut Exmoor gelding, **Friaky**, 6 y.; s., Arab.

**III. (£3.)**—J. KENNEDY, Carlton Lodge, Westbury-on-Trym, chestnut, **Rosebery**, aged.

**R.**—R. TROTT, Uffington, Taunton, bay, **Lady Wickham**, 4 y.; s., Wickham; d., Sally; s. of d., Foxstranger.

**CLASS 21.—*Pony Mare or Gelding, not over 13 hands.*** [2 entries.]

**I. (£10.)**—J. H. BAKER, Southam, Heavitree, Exeter, grey Exmoor gelding, **Sam**, 5 y.

**II. (£5.)**—J. H. BAKER, Elbury, near Weston-super-Mare, steel grey, **Belie**, 4 y., s. Express Guard; d., Little Belle.

### HARNESSES.

**CLASS 22.**—*Harness Mare or Gelding, over 14 hands, and not over 15·2.* [2 entries.]

**I (£10.)**—E. S. GODSELL, Stroud, Gloucester, brown gelding, **Lord Bath**, 6 y., off.

**II (£5.)**—E. S. GODSELL, brown, **Duke of York**, 6 y., off.

**CLASS 23.**—*Harness Hare or Gelding, not over 14 hands.* [4 entries.]

**I (£10.)**—Sir H. F. DE TRAFFORD, Bart., The Stud Farm, Flordon, Norwich, bay, **Georgina 5th**, 5 y., bred by C. W. Wilson, Rigmaden Park, Kirkby Lonsdale; s., Sir George (778); d., Georgina II. (3851); s. of d., Sir George (778).

**II (£5.)**—W. J. PARKER LANSDOWN, Castle Street, Bristol, bay gelding, **Sensation**, 6 y.

**III (£3.)**—J. WHITE, Taunton, black mare, **Black Bess**, 6 y.

**CLASS 23A.**—*Pair of Horses to be driven Tandem.* [1 entry.]

**I (£10.)\***—E. S. GODSELL, Stroud, Gloucester, brown geldings, **Lord Bath** and **Duke of York**, 6 y., off.

## CATTLE.

### DEVON.

**CLASS 24.**—*Devon Bull, calved in 1891 or 1892.* [7 entries.]

**I (£15)** and **Champion (£10.)†**—Sir W. R. WILLIAMS, Bart., Upcot House, Pilton, Barnstaple, **Pretty Middling 2nd** (3172), 2 y., 11 m., 2 w., 2 d.; s., **Pretty Middling** (2859); d., **Rosebud 4th** (11,110); s. of d., **Foreman 2nd** (1969).

**II (£10.)**—A. BOWERMAN, Capton, Williton, Taunton, **Pretty Middling 3rd**, 2 y., 8 m., 2 w., 4 d., bred by Sir W. R. Williams, Bart., Horridge, Barnstaple; s., **Pretty Middling** (2859); d., **Fashion** (5865); s. of d., **Duke of Flitton 17th** (1544).

**III (£5.)**—E. MUCKLOW, Whitstone Head, Cornwall, **Marquis of Wolseley** (3162), 3 y., 4 m., 3 d.; bred by W. H. Punched, Bourton Hall, Totnes; s., **Lord Wolseley** (2063); d., **Gentle 24th** (9796); s. of d., **Lord Currypool** (1589).

**R. & H. C.**—W. LETHBRIDGE, Wood, South Tawton, Okehampton, **Bravo Tempter 3rd** (3077), 3 y., 1 w., 3 d.; s., **Bravo Tempter 2nd** (2543); d., **Young Brownie** (10,032); s. of d., **Master Bertie** (2070).

**C.**—W. TRICK, Flitton Barton, North Molton, **Fisherman** (2977), 4 y., 2 m., 1 w., 2 d., bred by Sir W. Williams; s., **Freshman** (2778); d., **Cheerful**; s. of d., **Earl Dodington** (1725).

\* Given by the Taunton Local Committee.

† Given by the Somerset Agricultural Association, for the Best Devon Bull in Class 24, 25, or 26.

**CLASS 25.—Devon Bull, calved in 1893. [4 entries.]**

**I. (£15).**—J. C. WILLIAMS, Caerhays Castle, St. Austell, **Pretty Middling 4th**, 2 y., 4 m., 6 d., bred by Sir W. R. Williams, Bart., Upcott, Barnstaple; s., Pretty Middling (2859); d., Fiction 2nd (11,108); s. of d., Foreman 2nd (1969).

**II. (£10).**—J. C. WILLIAMS, Werrington Park, Launceston, **Dongola**, 2 y., 3 m., 1 w.; s., Koran (2802); d., Diamond Necklet (8781); s. of d., Bravo (1686).

**R.**—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Duke of Bridgwater** (3258), 2 y., 4 m., 1 w., 4 d.; s., Baronet (1897); d., Lady Currypool 6th (12,120); s. of d., Duke of Wellington (1955).

**C.**—P. H. TAMLYN, Boode House, Braunton, North Devon, **Duke of Cambridge**, 1 y., 11 m., 1 d.; s., Young English Gentleman (1869); d., Fillpail (11,804); s. of d., Benedict (2341).

**CLASS 26.—Devon Bull, calved in 1894. [9 entries.]**

**I. (£15) and Extra (£5).\***—J. C. WILLIAMS, Caerhays Castle, St. Austell, **Afterthought**, 1 y., 1 m., 1 w., 1 d., bred by Sir W. R. Williams, Bart., Upcott, Barnstaple; s., Pretty Middling 2nd (3172); d., Fiction 3rd (11,889); s. of d., Captain (2204).

**II. (£10).**—P. H. TAMLYN, Boode House, Braunton, N. Devon, **Prince of the Roses**, 1 y., 1 w.; s., Welcombe (3067); d., Primrose (9164); s. of d., Monarch (2090).

**III. (£3).**—E. MUCKLOW, Whitstone Head, Cornwall, **Whitstone Magna Charta**, 1 y., 2 m., 2 w., 5 d.; s., Whitstone Merryman (3211); d., Dorothy (11,670); s. of d., Lord Wolseley (2063).

**R. & H. C.**—J. C. WILLIAMS, Werrington Park, Launceston, 1 y., 2 m., 2 w.; s., Captain (2204); d., Diamond Necklet 3rd (12,560); s. of d., Duke of Flitton 17th (1544).

**H. C.**—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Somerset, **Duke of Pound 26th**, 1 y., 2 w., 6 d.; s., Compensator (2942); d., Duchess 17th (8988); s. of d., Lord Currypool (1589).

**CLASS 27.—Cow, in-Milk or in-Calf, calved before 1892. [6 entries.]**

**. (£15) and Champion (£10.)†**—A. C. SKINNER, Pound Farm, Bishop's Lydeard, **Duchess 29th** (11,727), 4 y., 9 m., 2 d.; s., Baron Golsoncott 4th (9,722); d., Duchess 17th (8988); s. of d., Lord Currypool (1589).

**L. (£10).**—J. C. WILLIAMS, Caerhays Castle, St. Austell, **Dorothy Jaggetail 3rd** (10,140), 7 y., 4 m., 2 w., bred by the late Viscount Plymouth, Tregothnan, Probus; s., Lord Wolseley (2063); d., Dorothy Jaggetail 2nd (5784); s. of d., Sir Michael (1646).

**II. (£3).**—A. TRIBLE, Halsdon Barton, Cookbury, Brandiscorner, N. Devon, **Thomasine**, 3 y., 6 m., 1 w., 1 d.; s., Daisy's Duke (2378); d., Tribles' Comfortress (13,681); s. of d., Baron Golsoncott 2nd (1895).

\* Given by the Taunton Local Committee, for the Second-Best Devon Bull in 1892, 24, 25, or 26.

† Given by the Somerset Agricultural Association, for the Best Cow or Heifer in 1892, 27, 28, 29, or 30.



**R. & H. C.**—W. THICK, Flitton Barton, North Molton, **Curly 8th** (2,584), 3 y., 6 m., 2 w., bred by F. Yendell, North Molton; s., Briton 2349; d., Curly 2nd; s. of d., Earl Dodington (1725).

**C.**—A. BOWERMAN, Capton, Williton, Somerset, **Strawberry**, 6 y., m., 1 d.; s., Admiral Wood (1880); d., Brassey 4th (7551);—and **H. TAMLYN**, Boode House, Braunton, N. Devon, **Joy**, 3 y., 8 m., w.; s., Young English Gentleman (1869); d., Joy (9886); s. of d., hunder (2157).

**CLASS 28.—Devon Heifer, in-Milk or in-Calf, calved in 1892.**

[4 entries.]

**I. (£15) and Extra (£5.)\***—A. C. SKINNER, Pound Farm, Bishop's Lydeard, **Myrtle 38th** (13,081), 3 y., 4 m., 2 w., 2 d.; s., Lord Passmore 2nd 2628; d., Myrtle 25th (9834); s. of d., Lord Currypool (1589).

**II. (£10.)**—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Famous 1rd** (13,106), 3 y., 1 m., 1 d.; s., Moss Rose's Colley (2093); d., Famous 1st 9861; s. of d., Morning Star (2092).

**R. & H. C.**—Sir W. H. WALROND, Bart., M.P., Bradfield, Cullompton, **Pearl** (12,850), 3 y., 3 m., 2 w., 1 d., bred by J. Hattin, Thorne St. Margaret, Wellington; s., Lord Currypool 2nd (2619); d., Pink (10,219); s. of d., Baron Golsoncott 2nd (1895).

**H. C.**—E. J. STANLEY, M.P., **Moss Rose 18th** (13,109), 2 y., 9 m., 3 w.; s., Tregothnan (2902); d., Moss Rose 10th (7109); s. of d., General Colley (1564).

**CLASS 29.—Devon Heifer, calved in 1893. [9 entries.]**

**I. (£10) and R. for Extra.\***—Sir W. R. WILLIAMS, Bart., Upcott House, Pilton, Barnstaple, **May** (13,720), 1 y., 11 m., 2 d.; s., Pretty Middling 2858; d., Rosebud 4th (11,110); s. of d., Foreman 2nd (1969).

**II. (£5.)**—A. C. SKINNER, Pound Farm, Bishop's Lydeard, **Moss Rose 2nd of Pound** (13,608), 2 y., 3 m., 1 w., 1 d.; s., Masterpiece (2837); l., Moss Rose 16 (11,737); s. of d., Baron Golsoncott 4th (2193).

**III. (£3.)**—A. C. SKINNER, **Fancy 19th of Pound** (13,602), 2 y., 2 w., 2 d.; s., Compensator (2942); d., Fancy 14th (11,729); s. of d., General Gordon 1974).

**R. & H. C.**—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, **Venus 1th** (13,648), 1 y., 10 m., 3 w., 3 d.; s., Baronet (1897); d., Venus 4 11,040; s. of d., Tempter 2nd (2153).

**CLASS 30.—Devon Heifer, calved in 1894. [9 entries.]**

**I. (£10.)**—J. C. WILLIAMS, Caerhays Castle, St. Austell, 1 y., 4 m., 1 w.; s., Cardsharp (3082); d., Nessie (7989); s. of d., Sir Michael (1646).

**II. (£5.)**—A. C. SKINNER, Pound Farm, Bishop's Lydeard, **Lady Bourton 3rd of Pound**, 1 y., 4 m., 1 w., 3 d.; s., Masterpiece (2837); l., Lady Bourton 2nd (11,675); s. of d., Freshman (2408).

**III. (£3.)**—Sir W. R. WILLIAMS, Bart., Upcott House, Pilton, Barnstaple, **Fashion 4th** (14,301), 1 y., 3 m., 1 w., 6 d.; s., Pretty Middling (2859); l., Fashion 2nd (11888); s. of d., Captain (2204).

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\* Given by the Taunton Local Committee, for the Second-Best Cow or Heifer in Class 27, 28, 29, or 30.

**R. & H. C.**—C. PRATT, Tale House, Payhembury, Ottery St. Mary, Lady Whitford 4th, 1 y., 4 m., 3 w., 3 d.; s., Champion (1696); d., Lady Whitford 2nd (11,735); s. of d., General Gordon (1974).

**H. C.**—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, Moss Rose 20th (14,212), 1 y., 4 m., 2 d.; s., Baronet (1897); d., Moss Rose II. (9863); s. of d., Royal Sam (2122):—and J. C. WILLIAMS, Werrington Park, Launceston, 1 y., 4 m., 1 w., 2 d.; s., Marmion (2642); d., Flame 3rd (9932); s. of d., Eclipse (1728).

**C.**—A. BOWERMAN, Capton, Williton, Somerset, Marigold, 7 m., 3 w.; s., Starlight; d., Strawberry; s. of d., Admiral Wood (1880):—J. CHICK, Compton Valence, Maiden Newton, Ruby 5th, 11 m., 3 w., 6 d.; s., Harold (2790); d., Ruby 4th (8211); s. of d., Rob Roy 2nd (1832):—and P. HORDEN TAMLIN, Boode House, Braunton, N. Devon, Queen of the Tulips, 1 y., 1 m., 3 w., 2 d.; s., Welcombe (3067); d., Tulip 3rd (9170); s. of d., Minnie's Duke (2089).

### SHORTHORN.

#### CLASS 31.—*Shorthorn Bull, calved in 1891 or 1892.* [7 entries.]

**I. (£15)** and **R.** for Champion.\*—J. D. WILLIS, Bapton Manor, Codford, Wilts, white, Adolphus, 2 y., 11 m., 1 w., 3 d.; s., King Stephen (46,559); d., Lady Augusta 3rd; s. of d., Banadullo.

**II. (£10).**—G. HARRISON, Underpark, Lealholm, Grosmont, roan, Royal Ury (63,302), 4 y., 1 m., 5 d., bred by W. S. Marr, Uppermill, Aberdeenshire; s., William of Orange (50,694); d., Roan Lady 5th; s. of d., Cherub 4th (33,359).

**III. (£5).**—LORD FITZHARDINGE, Berkeley Castle, Berkeley, red and white, Dolphin (63,873), 2 y., 8 m.; s., Leonidus (59,260); d., Dowager 11th; s. of d., Prince Airdrie (48,472).

**R.**—W. J. HOSKEN, Loggans Mill, Hayle, Cornwall, roan, Treforrest (63,452), 3 y., 9 m., 3 d., bred by R. Stratton, The Duffryn, Newport; s., Red Mowbray (57,971); d., Rose of Tredegar; s. of d., Bellerophon (47,471).

#### CLASS 32.—*Shorthorn Bull, calved in 1893.* [6 entries.]

**I. (£15).**—J. D. WILLIS, Bapton Manor, Codford, Wilts, roan, Capt. Doon, 1 y., 8 m., 1 w., 2 d.; s., Captain of the Guard (58,596); d., Constance Doon; s. of d., Marquis of Blandford 6th (41,983).

**I. (£10).**—G. HARRISON, Underpark, Lealholm, Grosmont, Yorks, roan, Champion Cup, 2 y., 4 m., 1 w., 6 d., bred by J. D. Willis, Bapton Manor, Codford; s., Challenge Cup (57,029); d., Cineraria; s. of d., Commodore (54,118).

**II. (£5).**—J. ECCLES, Myerscough House, Garstang, R.S.O., roan, Captain Gazelle, 2 y., 2 m., 2 w., bred by J. D. Willis; s., Captain of the Guard, Blanche Gazelle (vol. xxxvi. p. 724).

**V. BOND**, Wargrave Manor, Twyford, Berks, roan, Royal Weymouth, 2 y., 3 w., 4 d., bred by J. Howell, St. Mary Street, Cardiff; s., Butterfly's Duke 2nd (56,454); d., Cymro Gwynn 3rd; s. of d., Leathfoll (55,852).

Given by the Somerset Agricultural Association for the Best Bull in 1893.

**CLASS 33.—*Shorthorn Bull, calved in 1894.* [12 entries.]**

**I. (£15) and Champion (£10.)\***—J. D. WILLIS, Bapton Manor, Codford, Wilts, roan, **Count Victor**, 1 y., 4 m., 1 w., 2 d.; s., Count Lavender (60,545); d., Victoria 8th; s. of d., Gondolier (52,956).

**II. (£10.)**—J. THORLEY, Ringdale House, Faringdon, Berks, roan, **Ringdale Hero**, 10 m., 2 d.; s., Count Waterloo; d., Tapling; s. of d., Young Briton (49,201).

**III. (£3.)**—Sir W. H. WILLIS, Bart., M.P., Coombe Lodge, Blagdon, R.S.O., roan, **Blagdon Lord Winterstoke**, 1 y., 4 m., bred by R. Stratton, Newport; s., Hornblower (62,724); d., Jubilee Gem; s. of d., Medallion (56,475).

**R.**—C. H. JOLIFFE, Goldicote, Stratford-on-Avon, red and little white, **Baron Bridekirk 20th**, 1 y., 2 m., 3 w., bred by J. Barnes, Baurgh Syke, Wigton, Cumberland; s., Pearl Prince (61,427); d., Bridekirk 8th (H.B., vol. xxxvii. p. 273); s. of d., Red Prince (46,960).

**H. C.**—LORD FITZHARDINGE, Berkeley Castle, Berkeley, roan, **Bevington**, 11 m., 3 w.; s., Lord Osberton (62,913); d., Blanch Rose 13th; s. of d., Duke of Tregunter 10th (54,224).

**CLASS 34.—*Shorthorn Cow, in-Milk or in-Calf, calved before 1892.* [13 entries.]**

**I. (£15.)**—G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, roan, **Warfare**, 4 y., 4 m., 1 w., 2 d., bred by S. Campbell, Kinellar, Aberdeenshire; s., First Consul (57,314); d., Roan Rosebud 2nd; s. of d., Gravesend (46,461).

**II. (£10.)**—W. J. HOSKEN, Loggan's Mill, Hayle, Cornwall, roan, **Bridecake 10th**, 5 y., 1 m., 1 d., bred by the late J. S. Bult, Dodhill House, Taunton; s., Cambridge Duke 20th (54,063); d., Bridecake 5th; s. of d., Duke of Hazlecote 48th (39,742).

**III. (£3.)**—J. LITTLE, Paxcroft Farm, near Trowbridge, Wilts, red and little white, **Butterfly**, 4 y., 1 m., 1 w., 2 d.

**H. C.**—E. M. WHITING, Totterdown, Weston-super-Mare, red, **Langford Countess**, 4 y., 4 m., 1 w., 2 d., bred by S. Hill, Langford, Bristol; s., Duke of Barrington 21st (55,601); d., Duchess of Heathermead 2nd; s. of d., Duke of Gloucester 9th (52,760).

**CLASS 35.—*Shorthorn Heifer, in-Milk or in-Calf, calved in 1892.* [6 entries.]**

**I. (£15) and Champion (£10.)†**—J. D. WILLIS, Bapton Manor, Codford, Wilts, red, **Miranda**, 2 y., 9 m., 5 d.; s., Count Lavender (60,545); d., Missie (125); s. of d., William of Orange (50,694).

**II. (£10.)**—J. D. WILLIS, red, **Sensation**, 3 y., 2 m., 3 w., 3 d.; s., Count Lavender (60,545); d., Seraphina 2nd; s. of d., Field Marshal (47,870).

**III. (£3.)**—C. W. BRIERLEY, The Lydiates, Brimfield, R.S.O., Herefordshire, red and white, **Rosedale Snowflake 2nd**, 3 y., 4 m., 1 w., 1 d.; s., Martinet (59,455); d., Rosedale Snowflake; s. of d., Rosedale Oxford.

\* Given by the Somerset Agricultural Association for the Best Bull in Class 31, 32, or 33.

† Given by the Somerset Agricultural Association for the Best Cow or Heifer in Class 34, 35, 36, or 37.

**R.**—C. H. JOLIFFE, Goldicote, Stratford-on-Avon, roan, **Baroness 20th**, 2 y., 11 m., 3 w., 4 d., bred by S. Hosken, Loggans Mill, Hayle, Cornwall: s., Oxford Beau 2nd (61,391); d., Baroness 21st (H.B., vol. xxxix. p. 427), s. of d., Duke of Tregunter 10th (54,224).

**CLASS 36.—Shorthorn Heifer, calved in 1893. [13 entries.]**

**I. (£10.)**—J. D. WILLIS, Bapton Manor, Codford, Wilts, roan, **Lavender Countess**, 2 y., 3 m., 2 w., 4 d.; s., Count Lavender (60,545); d., Lavender 59; s. of d., Gondomar (55,821).

**II. (£5.)**—G. HARRISON, Underpark, Lealholm, Grosmont, Yorks, roan, **Gratia**, 2 y., 4 m., 2 w., 2 d., bred by J. Thompson, Kirkham, Lancashire: s., British Ingram 2nd (62,223); d., Nun; s. of d., Man of War (50,015).

**III. (£3.)**—G. HARRISON, roan, **Blanche**, 2 y., 2 m.; s., Mariano (62,965); d., Brenda 2nd; s. of d., British Leader (60,417).

**R.**—W. J. HOSKEN, Loggans Mill, Hayle, Cornwall, roan, **Rose of Oxford 14th**, 2 y., 3 m., 1 w., 2 d.; s., Oxford Beau 2nd (61,391); d., Rose of Oxford 13th; s. of d., Duke of Tregunter 10th (54,224).

**H. C.**—F. W. BOND, Wargrave Manor, Twyford, white, **Welsh Gem**, 2 y., 2 m., 2 w., bred by Lord Bute, Cardiff Castle; s., Unionist (60,093); d., Bright Gem; s. of d., Lord Granville (64,325).

**CLASS 37.—Shorthorn Heifer, calved in 1894. [11 entries.]**

**I. (£10.)**—J. D. WILLIS, Bapton Manor, Codford, Wilts, red, **Seraph**, 1 y., 3 m., 2 w., 2 d.; s., Roan Robin (57,992); d., Spicey 13th; s. of d., Masterstroke (57,751).

**II. (£5.)**—F. W. BOND, Wargrave Manor, Twyford, Berks, roan, **Wargrave Marchal Niel**, 1 y., 4 m., 1 w., 3 d.; s., Rosedale Farmer (63,234); d., Gertrude 2nd; s. of d., Rissington Prince (59,760).

**III. (£3.)**—C. W. BRIERLEY, The Lydiates, Brimfield, R.S.O., Herefordshire, roan, **Twilight Dream**, 1 y., 2 m., 3 w., 4 d.; s., Rosedale George (63,235); d., Strawberry 5th; s. of d., Prosperity (54,876).

**R.**—W. J. HOSKEN, Loggans Mill, Hayle, Cornwall, white, **Duchess of Townley 24th**, 1 y., 4 m., 3 w., 6 d.; s., Oxford Beau 2nd (61,391); d., Duchess of Townley 21st; s. of d., Duke of Tregunter 10th (54,224).

**V. H. C.**—G. HARRISON, Underpark, Lealholm, Grosmont, Yorks, roan, **Princess Mary**, 1 y., 4 m., 3 w.; s., Royal Ury (63,302); d., Princess Annie; s. of d., Prince Waterloo 3rd (45,422).

**H. C.**—H. T. COOKSON, Sturford Mead, Warminster, red, **Gussie**, 1 y., 2 m., 2 w.; s., Scottish Canadian (64,804, vol. xxxix. p. 166); d., Augusta 9th (vol. xxxviii. p. 250); s. of d., Royal George (50,369).

**HEREFORD.**

**CLASS 38.—Shorthorn Heifer, calved in 1891 or 1892. [5 entries.]**

**I. (£10.)**—J. H. ARKRIGHT, Leominster, **Lead On**, 3 y., 2 m., 4 d., bred by S. Hughes, Wintercote, Leominster; s., Seabreeze.

**II. (£10.)**—J. H. ARKRIGHT, Hampton Court, Leominster, **Happy Hampton** (16,097), 4 y., 4 m., 1 w.; s., Hilarity (8734); d., Pearl 9th; s. of d., Lord Rye (53,685).

**III. (£5.)**—**EARL OF COVENTRY**, Croome Court, Severn Stoke, Worcester-shire, **Courtier** (16,656), 2 y., 11 m., 1 w., 5 d.; s., Royal Ruler (13,406); Counterfeit; s. of d., Adelbert (8185).

**H. C.**—**J. H. ARKWRIGHT**, **Pearl Cross** (16,882), 3 y., 3 m., 2 w., 6 d.; Rose Cross 2nd (14,865); d., Pearl 5th; s. of d., Conjuror (5264);—and **EARL OF COVENTRY**, **Meistersinger** (16,851), 2 y., 8 m., 2 d.; s. Royal uler (13,406); d. Meg; s. of d., Plough Monday (9054).

**CLASS 39.—Hereford Bull, calved in 1893. [4 entries.]**

**I. (£15.)**—**A. E. HUGHES**, Wintercott, Leominster, **Liberty** (17,338), y., 2 m., 3 w., 1 d.; s., Albion (15,027); d., Lofty; s. of d., Rudolph (660).

**II. (£10.)**—**EARL OF COVENTRY**, Croome Court, Severn Stoke, Worcester-shire, **Grandison**, 2 y., 2 m., 5 d.; s., Senator (14,896); d., Gaudy Bauble l.; s. of d., Rare Sovereign (10,499).

**R. & H. C.**—**H. W. TAYLOR**, Showle Court, Ledbury, **Balfour** (17,096), y., 10 m., 2 w., 1 d.; s., Bombardier (12,869); d., Echo; s. of d., Franklin (961).

**CLASS 40.—Hereford Bull, calved in 1894. [6 entries.]**

**I. (£15.)**—**A. E. HUGHES**, Wintercott, Leominster, **Ladas**, 1 y., 3 m., w., 5 d.; s., Albion (15,027); d., Lofty 2nd; s. of d., Seabreeze (14,153).

**II. (£10.)**—**EARL OF COVENTRY**, Croome Court, Severn Stoke, Worcester-shire, **Lothario**, 1 y., 4 m., 1 w., 1 d.; s., Royal Ruler (13,406); d., Lois; . of d., Rondeau (11,622).

**III. (£8.)**—**EARL OF COVENTRY**, **Monitor**, 1 y., 4 m., 2 d.; s., Missionary 16,857); d., Beryl III.; s. of d., Royal Ruler (13,406).

**R. & H. C.**—**J. EDWARDS**, Rhiwlas Farm, 'Tittley, R.S.O., Herefordshire, **Farfield**, 1 y., 4 m., 1 w., 6 d.; s., Gladstone (16,733); d., Beatrice 4th; . of d., Radical (11,578).

**H. C.**—**R. KEENE**, Llanvihangel Court, Rogiet, 'Chepstow, **Romanoff**, y., 4 m., 3 w.; s., Regularity (16,320); d., Blanche 2nd; s. of d., Return 6639).

**C.**—**E. WIGHT**, Tedstone Court, Herefordshire, **Vainhope**, 1 y., 4 m., 4 d., red by E. Yeld, Endale, Leominster; s., Hope (13,872); d., Luna Wilton vol. xxi. p. 707); s. of d., Tom Wilton (9322).

**CLASS 41.—Hereford Cow, in-Milk or in-Calf, calved before 1892. [4 entries.]**

**I. (£15.)**—**W. TUDGE**, Leinthall, Ludlow, **Lady Lulu**, 6 y., 2 w., 3 d.; s., Viscount Wilton (11,824); d., Lady Lucy (vol. xix. p. 687); s. of d., Auctioneer (5194).

**II. (£10.)**—**E. WIGHT**, Tedstone Court, Herefordshire, **Iris**, 8 y., 1 m., 29 d.; s., Champion (9686); d., Lovely 14th (vol. xviii. p. 705); s. of d., Tedstone (8097).

**R. & H. C.**—**J. THOMAS**, Staunton Court, Staunton-on-Arrow, Hereford-shire, **Lady Alice**, 8 y., 11 m., 3 w., 6 d., bred by B. Rogers, The Grove, 'Embridge; s., Assurance (5913); d., Lady 10th; s. of d., Grand Duke 5342).

**CLASS 42.—Hereford Heifer, in-Milk or in-Calf, calved in 1892.**  
[3 entries.]

**I. (£15).**—A. P. TURNER, The Leen, Pembridge, Herefordshire, **Gwendoline**, 3 y., 4 m., 3 w.; s., Merlin (7851); d., Olive; s. of d., Sir Edward (10,631).

**II. (£10).**—T. FENN, Stonebrook House, Ludlow, **Downton Heiress**, 3 y., 2 m., 1 w.; s., Viscount Wilton (11,824); d., Downton Hermia; s. of d., Bourton (11,005).

**R. & H. C.**—H. W. TAYLOR, Showle Court, Ledbury, **Tweenie**, 3 y., 2 m., 3 w., 6 d.; s., Reality (14,823); d., Marigold; s. of d., Franklin (6961).

**CLASS 43.—Hereford Heifer, calved in 1893.** [6 entries.]

**I. (£10).**—R. GREEN, The Whittern, Kington, Herefordshire, **Sister Perilla**, 2 y., 4 m., 2 w., 5 d.; s., Whittern Grove (10,843); d., Miss Perfection; s. of d., Lord Wilton (4740).

**II. (£5).**—R. GREEN, **Mildmay**, 2 y., 4 m., 1 w., 5 d.; s., Pioneer (16,269); d., Maggie 2nd; s. of d., Alexander (8193).

**III. (£3).**—W. H. COOKE, The Green, Shelsley Kings, Worcester, **Hyoscyamus**, 2 y., 4 m., 2 w., 5 d.; s., Grove Wilton 4th (13,846); d., Rosa; s. of d., Bruce (12,893).

**R. & H. C.**—H. W. TAYLOR, Showle Court, Ledbury, **Moorish Maiden**, 2 y., 3 m., 2 w., 4 d.; s., Bombardier (12,869); d., Venus 4th; s. of d., Thorold (6226).

**C.**—W. TUDGE, Leinthall, Ludlow, **Royal Ruby**, 2 y., 4 m., 1 w., 2 d.; s., Ancient Briton (15,034); d., Amethyst (vol. xxii. p. 715); s. of d., Viscount Wilton (11,824).

**CLASS 44.—Hereford Heifer, calved in 1894.** [10 entries.]

**I. (£10).**—R. EDWARDS, Strangeworth, Pembridge, R.S.O., Hereford, **Beryl**, 1 y., 4 m.; s., Sheriffs Whittern Grove (16,990); d., Bangle; s. of d., Shaftesbury (11,676).

**II. (£5).**—R. KEENE, Llanvihangel Court, Rogiet, Chepstow, **Roulette**, 1 y., 4 m., 3 w.; s., Ruler (16,365); d., Mignonette; s. of d., Pembridge (10,387).

**III. (£3).**—R. GREEN, The Whittern, Kington, Herefordshire, **Wild Briar**, 1 y., 4 m., 3 w., 2 d.; s., Pioneer (16,269); d., Wild Rose; s. of d., Rose Stock (6651).

**R. & H. C.**—A. P. TURNER, The Leen, Pembridge, Herefordshire, **General**, 1 y., 4 m., 2 d.; s., Statesmen (14,938); d., Sabrina; s. of d., Pipton Sovereign (6603).

**1. C.**—H. W. TAYLOR, Showle Court, Ledbury, 1 y., 3 m., 1 w.; Bombardier (12,869); d., Sister Mary; s. of d., Admiral (12,797).

**2.**—Col. BRIDGFORD, Kinnersley, Hereford, **Lark**, 1 y., 3 m., 2 w.; s., Ardarn; d., Leila; s. of d., Romulus (5543):—Col. BRIDGFORD, **Gwendoline**, 1 y., 1 m., 2 w., 1 d.; s., Ardarn (16,516); d., Patience; s. of d., **ONE** (7313):—EARL OF COVENTRY, Croome Court, Severn Stoke, Worcestershire, **Winsome**, 1 y., 4 m., 1 w., 1 d.; s., Rumpelstiltskin (14,878); d., Winifred; s. of d., Adonis (10,926):—EARL OF COVENTRY, **Teacher**, 1 y., 2 m., 2 w., 4 d.; s., Royal Ruler (13,406); d., Volary;

of d., Consul (7513):—and H. W. TAYLOR, **Forget-Me-Not**, 1 y., 2 m., w., 6 d.; s., Prince George (12,561); d., Patience 2nd; s. of d., Franklin (861).

# **SUSSEX.**

## **CLASS 45.—*Sussex Bull, calved in 1891 or 1892.* [5 entries.]**

**I. (£15.)**—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, **Cherry Duke** (1321), 2 y., 11 m., 1 w.; s., Grand Duke (1322); d., Cherry Blossom (939); s. of d., Bedlam 3rd (660).

**II. (£10.)**—Miss E. S. WOLFE, Crowborough, Sussex, **Crowborough**, y., 2 m., 3 w., 3 d.; s., Gold Dust II. (677); d., Marguerite (4066); s. of d., Rankenstein 4th (540).

**R. & H. C.**—L. HUTH, Possingworth Manor, Waldron, Sussex, **Lord Beckley 19th** (1270), 3 y., 3 m., 3 w., 6 d.; s., Lord Beckley 6th (700); s., Virgin 15th (3854); s. of d., Sir William (520).

**H. C.**—EARL OF DERBY, Birtley, Witley, Surrey, **Gladiator** (1171), y., 3 m., 2 w.; s., Jubilee (826); d., Gladstone 3rd (4008); s. of d., Oxford 2nd (771):—and EARL OF DERBY, **Proud Prince** (1249), 3 y., 4 m., w., 3 d.; s., Dog Daisy (1112); d., Pride of the Family 2nd (2469); s. of d., Young Hartley (444).

## **CLASS 46.—*Sussex Bull, calved in 1893.* [3 entries.]**

**I. (£15.)**—EARL WINTERTON, Shillinglee Park, Petworth, **Shylock** (1343), 2 y., 2 m., 1 w., 4 d., bred by J. S. Hodgson, Lythe Hill, Haslemere; s., Dog Daisy (1112); d., Laura 7th (3268); s. of d., Lord Oxford (461).

**II. (£10.)**—L. HUTH, Possingworth Manor, Waldron, Sussex, **Royal Lilly** (1320), 1 y., 10 m., 3 w., 2 d.; s., Lord Beckley 16th; d., Lilly 9th (4444); s. of d., Parisian (626).

## **CLASS 47.—*Sussex Bull, calved in 1894.* [5 entries.]**

**I. (£15.)**—EARL OF DERBY, Birtley, Witley, Surrey, **Gladstone Prince** (1370), 1 y., 3 m., 3 w., 5 d.; s., Proud Prince (1249); d., Gladstone 3rd (4009); s. of d., Oxford 2nd (771).

**II. (£10.)**—F. WARDE, Aldon, Addington, West Malling, Kent, **Aldon Duke** (13,927), 1 y., 4 m., 2 w., bred by J. Godman, Park Hatch, Godalming; s., Oxford Duke 6th (1188); d., Claret Cup (3676); s. of d., Goldboy (541).

**R.**—W. WOOD, jun., Hassocks, Sussex, **Westmeston 6th** (1399), 11 m., w.; s., Tosser (1007); d., Young Golding 2nd (3375); s. of d., Oxford 1st (513).

## **CLASS 48.—*Sussex Cow, in-Milk or in-Calf, calved before 1892.***

[4 entries.]

**I. (£15.)**—EARL OF DERBY, Birtley, Witley, Surrey, **Tansy** (4695), 6 y., m., 1 w., 6 d., bred by J. Braby, Maybanks, Rudgwick, Sussex; s., Courtwick (801); d., Twilight (3360); s. of d., Fitzgerald (498).

**II. (£10.)**—L. HUTH, Possingworth Manor, Waldron, Sussex, **Lilly 16th** (5584), 3 y., 9 m., 2 w., 4 d.; s., Fitzgerald 8th (1204); d., Lilly 9th (4444); s. of d., Parisian (626).

**CLASS 49.—Sussex Heifer, in-Milk or in-Calf, calved in 1892.**

[4 entries.]

**I. (£15).**—F. WARDE, Aldon, Addington, West Malling, Kent, **Aldon Prebble C** (6057), 2 y., 11 m., 1 w., 3 d.; s., Red Hill Gold-dust (927); d., Prebble C 1 (3320); s. of d., Steyning (309).

**II. (£10).**—EARL OF DERBY, Birtley, Witley, Surrey, **Honey Lass** (5851), 3 y., 4 m., 2 w., 5 d.; s., Lord Oxeye (954); d., Honey 3rd (3753); s. of d., Percy (712).

**CLASS 50.—Sussex Heifer, calved in 1893. [7 entries.]**

**I. (£10).**—F. WARDE, Aldon, Addington, West Malling, Kent, **Aldon Emily** (6362), 2 y., 3 m., 3 w., 6 d., bred by J. S. Hodgson, Lythe Hill, Haslemere; s., Headley (1201); d., Young Emily 5th (5123); s. of d., Silversmith (849).

**II. (£5).**—G. WARDE, Tutsham, West Farleigh, Kent, **Dulcimer 3rd** (6365), 1 y., 11 m., 3 w., 6 d.; s., Dog Rose (1086); d., Dulcimer (6066); s. of d., Hadlow 3rd (824).

**III. (£3).**—Major BEST, Park House, Boxley, Maidstone, **Dinah** (6140), 2 y., 4 m., 3 w., 6 d.; s., Oxford Duke 1st (840); d., Dahlia 3rd (3429); s. of d., Napoleon 3rd (396).

**R.**—EARL OF DERBY, Birtley, Witley, Surrey, **Turtle Dove** (6185), 2 y., 1 m., 2 w., 6 d.; s., Lord Oxeye of Wantley (1070); d., Twilight (3366); s. of d., Fitzgerald (498).

**H. C.**—W. S. FORSTER, Gore Court, Maidstone, **Bernina** (6208), 1 y., 10 m., 1 w., 1 d.; s., Gondolier (1001); d., Stately (3832); s. of d., Lord Beaconsfield (459);—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, **Gentle 8th**, 2 y., 4 m., 2 w., bred by J. S. Hodgson, Lythe Hill, Haslemere; s., Lord Oxeye of Wantley (1070); d., Gentle 7th (4811); s. of d., Silver-smith (849);—and EARL WINTERTON, Shillinglee Park, Petworth, **Silver 5th** (6384), 2 y., 2 m., 2 w., 3 d.; s., Spartan (956); d., Silver 3rd (5309); s. of d., Gold (815).

**CLASS 51.—Sussex Heifer, calved in 1894. [6 entries.]**

**I. (£10).**—F. WARDE, Aldon, Addington, West Malling, Kent, **Aldon Butterfly 2nd** (6669), 1 y., 3 m., 2 w., 2 d.; s., Dog Rose (1036); d., Butterfly 1st (4354); s. of d., Buffer (663).

**II. (£5).**—EARL OF DERBY, Birtley, Witley, Surrey, **Lady Fanny Fern** (6500), 1 y., 4 m., 2 w., 6 d.; s., Lord Oxeye of Wantley (1070); d., Lady Fern (6499); s. of d., Gold-dust 15th (863).

**III. (£3).**—Major BEST, Park House, Boxley, Maidstone, **Flora**, 1 y., 4 m., 6 d.; s., Marechal Niel (1180); d., Grandiflora (4627); s. of d., Frankfort 1st (811).

**C.**—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, **Pearblossom 1st**, 1 y., 3 m., 2 w., bred by W. S. Forster, Maidstone; s., Claude (1177); d., Pearblossom (5181); s. of d., Hemlock (1002).

**JERSEY.****CLASS 52.—Jersey Bull, calved in 1891 or 1892. [5 entries.]**

**I. (£15).**—J. BLYTH, Rlythwood, Stansted, Essex, dark grey, **Victoria's** 3rd, 1 y., 1 m., 1 w., 1 d., bred by J. Falla, St. Martin's, Jersey; s.,



den Pink (I.H.B., 1491, P.S.H.C.); d., Victoria 2nd (I.H.B., 3284, H.C.).

**I. (£10).**—Mrs. C. McINTOSH, Havering Atte Bower, Havering, Essex, k grey, **Reaper** (1885, H.C.), 2 y., 11 m., 3 w., bred by J. T. Michel, St. er's, Jersey; s., Radical (1470, H.C.); d., Maud (3396, H.C.); s. of d., u Gustave (865).

**2. & H. C.**—R. J. POPE, J.P., Beresford Manor, Plumpton, Lewes, whole, **votion's Lad**, 3 y., 2 m., 3 w., bred by J. E. Grandin, Jersey; s., Dis- tion's Pride; d., Devotion 6th.

**3. C.**—A. GIBBS, Tyntesfield, near Bristol, whole, **Defiance**, 3 y., 2 w., l., bred by J. H. Cornish, Sherborne; s., Kaiser's Prince (3420); d., dora; s. of d., Marcus (3510):—and LORD ROTHSCHILD, Tring Park, ts, dark bronze, **Flora's Lad**, 4 y., 1 m., 3 d.; s., Fan's Lad (3265); Flora 6th (vol. v. p. 344); s. of d., Diomed (2384).

**CLASS 53.—Jersey Bull, calved in 1893. [15 entries.]**

**I. (£15).**—Mrs. E. E. STARRIE, Mitchells, Saffron Walden, whole, **onfille's Lad**, 2 y., 4 w.; s., Hillside Lad (3369); d., Gronfille; s. of d., ouville's Champion (O.T.).

**II. (£10).**—Sir G. GREENALL, Bart., Walton Hall, Warrington, brown, **y Lord**, 2 y., 5 m., bred by C. Simon, St. John's, Jersey; s., Wonder d (1390, J.H.B.); d., Polite Carlo (1418, J.H.B.); s. of d., Royal Jasper 12, J.H.B.).

**III. (£5).**—EARL CADOGAN, K.G., Culford House, Bury St. Edmunds, ck, **Nevada**, 2 y., 5 d.; s., Columbus (3184); d., Neroline; s. of d., tor (2131).

**R. & V. H. C.**—J. R. CORBETT, More Place, Betchworth, grey, **Edward**, r., 10 m., 3 w.; s. Harry (4580); d., Emily 12th; s. of d., Franciscan.

**V. H. C.**—A. S. MARSDEN-SMEDLEY, Normanhurst, Matlock, dark fawn, **mk's Lad** (4639), 2 y., 3 m., 3 d., bred by Mrs. E. E. Starkie, Saffron lden, Essex; s., Bridegroom (4492); d., Crystal (E.J.H.B., vol. v.); f d., Valentine 3rd (3891).

**3. C.**—J. BLYTH, Blythwood, Stansted, Essex, dark brown, **Grouville's lk**, 1 y., 11 m., 6 d.; s., Grouville's Champion (3346); d., Grouville's ian; s. of d., Grouville's Champion (3346):—Mrs. C. McINTOSH, Havering e Bower, Havering, Essex, dark fawn, **Morning Star**, 2 y., 1 m., 2 w., , bred by W. Alexander, St. Mary's, Jersey; s., Lowland King (1673); Jubilee Star (4607, H.C.); s. of d., Rosy's Wonder (835):—Miss NDISH, New Park, Brockenhurst, Hants, grey, **Badier's Ladas**, 1 y., m., 2 w., 6 d., bred by N. Cabot, St. Laurence, Jersey; s., Rosebery's Lad 30, J.H.B.); d., Badier's Fancy (4395); s. of d., Sir William 2nd 10):—and C. C. TUDWAY, Walcombe Dairy, Wells, Somerset, whole, **nte Carlo of Wells**, 1 y., 5 m., 3 w., 2 d., bred by — Arkwright, ton Scarsdale, Chesterfield; s., Orange Peel (4702); d., Monte Carlo p. vol. v. p. 664); s. of d., Carlo 3rd.

**4.**—H. McCALMONT, Bishopswood, Ross, whole, **Distinction's Security**, r., 9 m., 2 w., 6 d., bred by J. Blyth, Blythwood, Stansted; s., Dis- tion's Pride (4060); d., Lady Safety; s. of d., Royal Khedive (2863):—

Mrs. C. M. PERKINS, Oak Dene, Holmwood, Surrey, grey, **Trooper nx**, 1 y., 5 m., 4 d.; s., Harry Lynx (4171); d., Daisy (vol. iii. p. 189); f d., Tommy (1264).

**CLASS 54.—Jersey Bull, calved in 1894. [24 entries.]**

**I. (£15.)**—LORD ROTHSCHILD, Tring Park, Herts, whole fawn, **Cicero**, 1 y., 2 w., 1 d.; s., Spot's Lad (4389), Crocus (vol. v. p. 723); s. of d., Count Wolseley 928 (3191).

**II. (£10.)**—FREETH and POCOCK, South Down Farm, Surbiton Hill, dark brown, **Magistrate**, 1 y., 1 m., 3 w., 1 d., bred by G. Malzard, St. Peter's, Jersey; s., Golden Lad (1242); d., Zulu's Pride (3452).

**III. (£3.)**—H. McCALMONT, Bishopswood, Ross, whole, **Havering Bismarck**, 1 y., 10 m., 1 d., bred by Mrs. McIntosh, Havering Park, Romford; s., Bismarck (3978); d., Rivals Julia 2nd; s. of d., La Commune's Prince (2584).

**R. & V. H. C.**—Sir G. GREENALL, Bart., Walton Hall, Warrington, brown grey, **Golden Baron** (2067, J.H.B.), 1 y., 4 m., 6 d., bred by T. Mourant, Trinity, Jersey; s., Golden Pink (1491, J.H.B.); d., Queen Lass (1179, J.H.B.).

**V. H. C.**—Sir G. GREENALL, Bart., brown, **Golden Brown**, 1 y., 2 m., 3 w., 5 d., bred by J. Le Brun, Trinity, Jersey; s., Golden Pink (1491, J.H.B.); d., Charlotte (3439, J.H.B.):—and R. J. POPE, J.P., Beresford Manor, Plumpton, Lewes, whole, **Prince of Beresford**, 1 y., 2 m., 3 w., bred by C. Mourant, Jersey; s., Gamboge Lad (1798); d., Fancy (423).

**H. C.**—EARL CADOGAN, K.G., Culford Hall, Bury St. Edmunds, silver grey, **Jason**, 1 y., 3 w., 6 d.; s., Columbus (3184); d., Juno; s. of d., Wolseley's Glory II.:—J. R. CORBETT, More Place, Betchworth, fawn, **Jonathan**, 11 m., 4 w., 1 d.; s., Franciscan (2449); d., Sweet Jessamine (vol. v. p. 703):—H. McCALMONT, whole, **Harry Bustle**, 1 y., 2 m., 3 w., 6 d., bred by Mrs. A. F. Perkins, Oak Dene, Holmwood; s., Harry Lynx (4171); d., Buzz (vol. iv. p. 197); s. of d., Jumbo (1124):—Mrs. C. M. PERKINS, Oakdene, Holmwood, Surrey, brown, **Fame's Duke**, 1 y., 3 m., 1 d., bred by Ph. Labey, Grouville, Jersey; s., Duke of Carteret (J.H.B., 1790); d., Fame 8th (J.H.B., 3421):—and R. J. POPE, J.P., whole, **Duke of Beresford**, 1 y., 2 m., bred by W. Leon, Jersey; s., Golden Hero (1033); d., Country Lass (2802).

**C.**—J. BLYTH, Blythwood, Stansted, Essex, dark grey, **Clement**, 1 y., 3 m., 3 w., 3 d., bred by J. Arthur, St. Mary's, Jersey; s., Duc (1751, J.H.B.); d., Clementine 2nd (3087, J.H.B.):—J. F. HALL, Sharcombe, Wells, Somerset, solid fawn, **King of the Pippins**, 10 m., 3 d.; s., Pippin (3648); d., Rowena 10th (E.J.H.B., vol. v. p. 647); s. of d., Wrangler (3008):—and Mrs. MCINTOSH, Havering Atte Bower, Havering, Essex, dark fawn, **Havering Star**, 1 y., 1 w., 3 d.; s., Reaper (1885, H.C.); d., Jubilee Star (4607, H.C.); s. of d., Rosy's Wonder (835).

*Special Prizes given by the English Jersey Cattle Society for the 3 Best Jersey Bulls of any age, exhibited in Class 52, 53, or 54, whose Dams, or Grand Dams, on either side, had won prizes or certificates of merit in the English Jersey Cattle Society's Butter Tests.*

[5 entries.]

**I. (£5.)**—J. R. CORBETT, More Place, Betchworth, fawn, **Jonathan**, 11 m., 4 w., 1 d.; s., Franciscan (2449); d., Sweet Jessamine (vol. v. p. 703).

**II. (£3.)**—Miss STANDISH, New Park, Brockenhurst, Hants, grey fawn, **Golden Sun**, 8 m., 3 w., 4 d.; s., Golden Twist (4561); d., Sunflower (imported); s. of d., Lord Wolseley 3rd (3490).

**III. (£2).**—Mrs. E. E. STARKIE, Mitchells, Saffron Waldon, Essex, whole, **Flora's Boy**, 1 y., 1 m., 1 w.; s., Fairplay (4085); d., Flora's Pearl; s. of d., Standard (1056).

**R.**—L. H. G. MORGAN, Woolcombe, near Wellington, Somerset, broken, **Dinnington Boy**, 2 y., 1 m., 1 w., 2 d., bred by R. P. Wheadon; s., Royal River (3756); d., Matilda Bright (3272, P.S.H.C.); s. of d., Bute's Fancy (3129).

**CLASS 55.—Jersey Cow, in-Milk or in-Calf, calved before 1892.**

[36 entries.]

**I. (£15).**—LORD ROTHSCHILD, Tring Park, Herts, fawn, **Oxford Dahlia**, 8 y., 3 m., 3 w., bred by J. P. Marett, St. Saviour's, Jersey; s., Sultan Cicero (398); d., Oxford Daisy (6616).

**II. (£10).**—Sir G. GREENALL, Bart., Walton Hall, Warrington, fawn, **Mabel XXIII** (3213, J.H.B.), 7 y., 3 m., 2 w., 5 d., bred by W. J. Labey, Grouville, Jersey; s., Everton King (390, J.H.B.); d., Mabel XIII. (1125, J.H.B.); s. of d., Guenon's Pride (347, J.H.B.).

**III. (£3).**—LORD ROTHSCHILD, whole fawn, **Bayleaf 4th**, 9 y., 2 m., 2 w., 4 d., bred by P. Arthur, St. Saviour's, Jersey; s., Wolseley (2165); d., Bayleaf (3557, F.S.C.).

**R. & V. H. C.**—Mrs. E. E. STARKIE, Mitchells, Saffron Walden, Essex, whole, **Granddaughter**, 4 y., 1 m., 3 w., 1 d.; bred by E. G. de la Perrelle, St. Helier's, Jersey; s., Sir William 2nd (1165); d., Daughter (2911).

**V. H. C.**—Sir G. GREENALL, Bart., brown, **Longueville Brownie**, 5 y., 2 m., 2 w., 2 d., bred by P. Arthur, St. Saviour's, Jersey; s., Trial (1187, J.H.B.); d., Luxemburg (3650, J.H.B.);—and Mrs. E. E. STARKIE, broken, **Flora's Pearl**, 6 y., 2 m., 3 w., 6 d., bred by C. De Gruchy, Trinity, Jersey; s., Standard (1056); d., Flora's Pride (954).

**H. C.**—H. McCALMONT, Bishopswood, Ross, light brown, **Clemence 3rd**, 5 y., 4 w., bred by F. Renaut, St. Mary's, Jersey; s., Rosy's Wonder (835); d., Clemence (7353, J.H.B.);—Mrs. C. M. PERKINS, Oakdene, Holmwood, Surrey, brown, **Test Me**, 7 y., 2 m., 1 w., 1 d., bred by P. Syvrit, St. Peter's, Jersey; s., Golden King (J.H.B., 955); d., Apparatus (J.H.B., 4032);—R. J. POPE, J.P., Beresford Manor, Plumpton, Sussex, white, **Maitland Lily**, 5 y., 5 m., 2 w., 4 d., bred by F. W. Le Brocq, Jersey;—and LORD ROTHSCHILD, grey, **Wigton 2nd** (vol. v. p. 750), 6 y., 11 m., 2 w., 3 d., bred by A. Gautier, St. Saviour's, Jersey; s., Count Wolseley (3191); d., Wigton (7198, F.S.C.); s. of d., Sir Robert (2061).

**C.**—J. BLYTH, Blythwood, Stansted, Essex, fawn, **Tenby**, 4 y., 4 w., bred by J. Touzel, St. Clement's, Jersey; s., Golden Lad (I.H.B., 1242); d., Texas (I.H.B., 2205);—H. McCALMONT, fawn, **Surprise**, 4 y., 1 m., bred by J. E. Grandin, St. Owen's, Jersey; s., Golden Lad (J.H.B., 1242); d., Devotion 6th (J.H.B., 326);—and for his fawn, **Scarsdale Florida**, 5 y., 4 m., 3 w., 3 d., bred by J. Arkwright, Sutton Scarsdale, Chesterfield; s., Marmalade (3515); d., Scarsdale Monte Carlo (vol. v. p. 664);—W. B. RODERICK, Fronhenlog, Llanelly, South Wales, brown, **Golden Drop 2nd**, 4 y., 4 m., 1 w., 5 d., bred by F. Desmares, St. Clement's, Jersey; s., Golden Stag (I.H.B., 1328); d., Golden Drop (I.H.B., 2448);—and C. C. TUDWAY, Walcombe Dairy, Wells, Somerset, whole fawn, **Alice** (vol. v. p. 543), 5 y., 3 m., 3 w., 6 d., bred by Lord Rothschild, Tring Park, Herts; s., Punch (J.H.B., 1000); d., Miss Alice (J.H.B., 2161, H.C.); s. of d., Count Cicero (P.S.H.C., 398).

**CLASS 56.—Jersey Heifer, in-Milk or in-Calf, calved in 1892.**  
[21 entries.]

**I. (£15).**—J. R. CORBETT, More Place, Betchworth, fawn, **Bessie 7**, 3 y., 3 m., 2 w., 5 d.; s., Franciscan (2449); d., Bessie 4 (vol. v. p. 187).

**II. (£10).**—A. GIBBS, Tyntesfield, near Bristol, fawn, **Buttercup 3rd**, 3 y., 1 m., 6 d.; s., Sir Peter; d., Buttercup; s. of d., Gordon.

**III. (£3).**—H. McCALMONT, Bishopswood, Ross, brown grey, **Trials Regina**, 3 y., 4 m., 1 w., 3 d., bred by P. Ozouf, St. Saviour's, Jersey; s., Trial (1187); d., Regina's Pride (7450).

**V. H. C.**—T. L. BROWN, Hallfield, Chard, fawn, **Dame Durden**, 3 y., 4 w., 1 d.; s., Yoicks (4455); d., Daisy Dimple; s. of d., Prince Romulus (2815, E.J.H.B.):—and H. McCALMONT, fawn, **Sweet Wonder 2nd**, 2 y., 11 m., 4 w., bred by W. Alexander, St. Mary's, Jersey; s., Casino (I.H.B., 1449); d., Sweet Wonder (I.H.B., 4163); s. of d., Rosy's Wonder (835).

**H. C.**—J. BLYTH, Blythwood, Stansted, Essex, grey brown, **Chestnut Girl**, 2 y., 6 m., 1 w., 4 d., bred by P. Ozouf, St. Saviour's, Jersey; s., Maggie's Boy (I.H.B., 1571); d., Chestnut Fawn 5th (I.H.B., 2948):—EARL CADOGAN, K.G., Culford Park, Bury St. Edmunds, silver grey, **Sunbeam**, 3 y., 2 m., 2 w., 5 d., bred by J. Touzel, St. Clement's, Jersey; s., Strawberry (1578); d., Moonbeam (2439):—and Mrs. C. McINTOSH, Havering Atte Bower, Havering, Essex, brown, **La Croix Primrose** (4997, H.C.), 3 y., 1 m., 3 d., bred by E. H. Nicolle, St. Martin's, Jersey; s., Golden Pink (1491); d., Le Douets Primrose (5782).

**C.**—FOWLER and DE LA PERRELLE, Southampton, fawn, **Survill's Bess F** (203, J.H.B.), 2 y., 6 m., bred by T. De Gruchy, Jersey; s., Lord Primrose (1500, J.H.B.); d., Primrose 2nd (880, J.H.B.):—Mrs. E. E. STARKIE, Mitchells, Saffron Walden, Essex, whole, **Goldfinch**, 3 y., 3 m., 2 w., 3 d., bred by A. J. Arthur, St. Owen's, Jersey; s., Toison d'or Champion (1544); d., Golden Daisy (7583):—and R. P. WHEADON, Leicester House, Ilminster, grey, **Herupus Belle 3rd**, 3 y., 2 m., 1 w., 6 d., bred by J. Le Boutillier, St. John's, Jersey; s., Golden Pink (1491); d., Herupus Belle (2034); s. of d., Nero du Coin (463).

**CLASS 57.—Jersey Heifer, calved in 1893.** [31 entries.]

**I. (£10.) and Champion (£10).\***—LORD ROTHSCHILD, Tring Park, Tring, brown, **Regina's Sultana 2nd**, 2 y., 3 m., 1 w., 2 d., bred by P. Ozouf, St. Saviour's, Jersey; s., Orme (4296); d., Regina's Sultana (J.J.H.B., 7686).

**II. (£5.) and R. for Champion.\***—J. BLYTH, Blythwood, Stansted, Essex, fawn, **Bayleaf**, 2 y., 2 m., 2 w., 5 d., bred by E. Ballaine, St. Peter's, Jersey; s., Skinner (I.H.B., 1620); d., Jeanne d'Arc 2nd (I.H.B., 2841).

**III. (£3).**—Sir G. GREENALL, Bart., Walton Hall, Warrington, fawn, **Golden Mona**, 2 y., 3 w., 2 d.; s., Golden Lad (1242, J.H.B.); d., Mona III.; s. of d., Leonidas (881, J.H.B.).

**R. & V. H. C.**—H. J. CORNISH, Thornford, Sherborne, Dorset, fawn, **Julista**, 2 y., 2 m., 3 w., 6 d., bred by Mrs. Le Boutillier, St. Owen's, Jersey; s., Merlin (1504, J.H.B.); d., Leonie 3rd.

**V. H. C.**—Mrs. E. E. STARKIE, Mitchells, Saffron Walden, Essex, whole, **Granddaughter 2nd**, 2 y., 2 m., 3 w., 2 d., bred by E. G. De la

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\* Given by the Taunton Local Committee, for the Best Jersey Heifer, in Milk, 1896, 56, 57, or 58.

Perrelle, St. Laurence, Jersey; s., Coomassie's Orphan (1623); d., Daughter 2912).

**H. C.**—**FOWLER** and **DE LA PERRELLE**, Southampton, fawn, **Essa's Lily F** (236, J.H.B.), 2 y., 2 m., bred by P. Le Morgnand, Jersey; s., Golden Lad (1242, J.H.B.); d., Essa 5th (3743, J.H.B.):—**J. F. HICKS**, Freemantle, Southampton, fawn grey, **Heliotrope**, 2 y., 2 m., 3 w., bred by J. T. Michel, St. Peter's, Jersey; s., Radical (1470); d., Lucy:—and for his dark brown, **Cora**, 1 y., 11 m., 3 w., bred by J. W. Le Brocq, Augorey, St. Peter's, Jersey; s., Golden Lad (1242); d., Princess of Oak 4th (4142):—and for his fawn and white, **Jessy**, 2 y., 3 m., 1 w., bred by J. Le Maistre, St. Owen's, Jersey; s., Mona's Lad (1631); d., St. Owen's Daisy:—**R. J. POPE**, J.P., Beresford Manor, Plumpton, Lewes, whole, **Countess Beresford**, 2 y., 4 m., 2 w., 3 d., bred by R. J. Pantin, Jersey; s., Hugo (1635); d., Froome (4013):—and **LORD ROTHSCHILD**, fawn and white, **Oxford Dawn**, 2 y., 1 m., 3 w., 6 d.; s., Pioneer (4311); d., Oxford Dahlia (imported); s. of d., Sultan Cicero (398).

**C.**—**H. J. CORNISH**, dark grey and white, **Diplomat 3rd**, 2 y., 3 m., 3 w., 5 d., bred by — Baal, St. Martin's, Jersey; s., Distinction's Glory (1680, J.H.B.); d., Diplomatc (7203, H.C.J.H.B.):—**FOWLER** and **DE LA PERRELLE**, fawn, **Mousey F** (235, J.H.B.), 2 y., 3 m., bred by P. Payne, Jersey; s., Rosa's Fortescue (1318, J.H.B.); d., Lady Love (2046, J.H.B.):—**Sir G. GREENALL**, Bart., brown, **Hope**, 2 y., 4 w., bred by Ph. Hamon, Jersey; s., Baron of St. John II. (1643, J.H.B.); d., Rosy III. 4207, J.H.B.):—and **Mrs. E. E. STARKIE**, whole, **Lily Wonder 2nd**, 1 y., 11 m., 4 w., bred by P. Bauche, St. Peter's, Jersey; s., Lowland King (1673); d., Lily Wonder (4702).

**CLASS 58.—Jersey Heifer, calved in 1894. [31 entries.]**

**I. (£10.)**—**LORD ROTHSCHILD**, Tring Park, Herts, fawn, **Oxford Dafnolil**, 11 m., 1 w., 3 d.; s., Nunthorpe (4648); d., Oxford Buttercup (J.J.H.B., 4820, H.C.); s. of d., Golden Lad (3324).

**II. (£5.)**—**LORD ROTHSCHILD**, fawn, **Vanilla 2nd**, 10 m., 2 w., 1 d., bred by F. Le Leivre, St. Clement's, Jersey; s., Golden Pride (J.J.H.B., 1903); d., Vanilla (J.J.H.B., 4727).

**III. (£3.)**—**Mrs. C. M. PERKINS**, Oak Dene, Holmwood, fawn, **Temeraire** 1 y., 3 m., 3 w., 6 d.; s., Torpedo; d., Tantrum; s. of d., Hurel (3378).

**R. & V. H. C.**—**Mrs. E. E. STARKIE**, Mitchells, Saffron Walden, whole, **Princess**, 1 y., 3 m., 1 w., 6 d.; s., Prancer (1865); d., Perry Farm Countess; s. of d., Apple Blossom's Prince (1368).

**V. H. C.**—**Sir G. GREENALL**, Bart., Walton Hall, Warrington, fawn, **Sultana**, 11 m., 4 w.; s., Golden Lad (1242, I.H.B.); d., Currant (3560, I.H.B.); s. of d., Kaiser's Prince (993, I.H.B.):—and for his fawn, **Daisy's Gem**, 1 y., 2 w., 2 d.; s., Little Gem (1828, I.H.B.); d., Daisy of the Valley; s. of d., Count Wolseley (928, I.H.B.):—and **Mrs. C. M. PERKINS**, fawn, **Sunny Fancy**, 1 y., 2 m., 3 w., 6 d.; s., Lord of the Sunny Isles (4243); d., Golden Fancy; s. of d., Golden Nero (3325).

**H. C.**—**H. J. CORNISH**, Thornford, Sherborne, Dorset, whole fawn, **Pearl of Thornford**, 1 y., 1 m., 1 w., 4 d.; s., Golden Prince; d., Pearl of Windsor; s. of d., Kaiser's Prince (3420):—**A. GIBBS**, Tyntesfield, near Bristol, broken, **Kitty's Surprise**, 1 y., 2 d.; s., Golden Prince (4559); d., Kitty's Pet; s. of d., Kaiser's Prince (3420):—**Mrs. C. McINTOSH**, Havering Atte Bower, Havering, Essex, fawn, **Pride of Havering**, 1 y., 3 w., 3 d., bred by W. Alexander, St. Mary's, Jersey; s., Young

Sultan (1809); d., Lily's Wonder (4702); s. of d., Zulu's Pride (1512, H.C.):—Lord ROTHSCHILD, fawn, **Golden Lassie**, 1 y., 4 m., 1 w., 2 d., bred by W. Jean, Trinity, Jersey; s., Golden Hero (J.J.H.B., 1833); d., Young Lassie 2nd (J.J.H.B., 3894):—and R. P. WHEADON, Leicester House, Ilminster, fawn, **Mignonne 4th**, 1 y., 1 m., 2 w., 6 d.; s., Royal River (3756, E.H.B.); d., Miguonne 2nd (Reg. 10, p. 115); s. of d., Monarch (1167).

C.—H. McCALMONT, Bishopswood, Ross, whole, **Wigton 6th**, 1 y., 2 m., 1 w., bred by Lord Rothschild; s., Flora's Lad (4098); d., Wigton 2nd (vol. v. p. 750); s. of d., Count Wolseley (3191):—and for his whole, **Glorie**, 1 y., 1 m., 3 w., 2 d.; bred by Lord Rothschild; s., Spot's President (4390); d., Gloire de Dijon; s. of d., Rosehill (3732):—and for his whole, **Fantee**, 1 y., 4 w., 1 d., bred by Sir G. Greenall; s., Golden Coast (1817, I.H.B.); d., Science 2nd:—C. C. TUDWAY, Walcombe Dairy, Wells, Somerset, whole, **Alice 2nd** (Reg. No. 10), 1 y., 1 m., 1 w., 2 d.; s., Pippin (3648); d., Alice (vol. v., 543); s. of d., Punch (J.H.B., 1000):—and for his whole, **Lena**, 6 m., 3 w., 5 d., bred by — Tanner, Frenchay Park, Bristol; s., Marius 3rd (Reg. No. 10, 4624); d., Lonely 4th; s. of d., The Spy:—and R. P. WHEADON, grey, **Countess 8th**, 1 y., 5 d.; s., Warpaint; d., Countess 7th.

#### BUTTER TEST PRIZES.\*

*Cow or Heifer in the Jersey Classes, eligible for the English Jersey Herd Book, yielding the largest quantity of Butter by the practical Test of the Separator and Churn.* [19 entries.]

I. (Gold Medal & £3.)—C. C. TUDWAY, Walcombe Dairy, Wells, Somerset, whole fawn, **Alice** (vol. v., 543), 5 y., 3 m., 3 w., 6 d., bred by Lord Rothschild, Tring Park, Herts; s., Punch (J.H.B., 1000); d., Miss Alice (J.H.B., 2161, H.C.); s. of d., Count Cicero (P.S.H.C., 398).

II. (Silver Medal & £3.)—T. L. BROWN, Hallfield, Chard, grey, **Desdemona**, 10 y., 7 m., 3 w., 5 d.; bred by — Cardus, Town Hill, Southampton; s., Dairy King; d., Darling; s. of d., Prince Charlie (694).

III. (Bronze Medal & £3.)—Dr. H. WATNEY, Buckhold, Pangbourne, Berks, fawn, **Mayblossom**, 7 y., 4 w., 1 d., bred by E. Du Pre, St. Peter's, Jersey; s., Carlo 3rd (2308); d., Lowland Daisy; s. of d., Perrott (1875).

**Certificate of Merit.**—Miss STANDISH, New Park, Brockenhurst, Hants, grey and white, **Blackbird**, 5 y., 3 m., 3 w., bred by J. E. Baudains, St. Peter's, Jersey; s., Castor (3154); d., Nightgown (1163); s. of d., Philidor (1880).

**Certificate of Merit.**—Mrs. E. E. STARKIE, Mitchells, Saffron Walden, Essex, broken, **Hora's Pearl**, 6 y., 2 m., 3 w., 6 d., bred by C. de Gruchy, Trinity, Jersey; s., Standard (1056); d., Hora's Pride (954).

**Certificate of Merit.**—Mrs. E. E. STARKIE, whole, **Granddaughter**, v., 1 m., 3 w., 1 d., bred by E. G. de la Perrelle, St. Helier's, Jersey; s., William 2nd (1165); d., Daughter (2911).

#### GUERNSEY.

CLASS 59.—*Guernsey Bull, calved in 1891 or 1892.* [7 entries.]

(£15.)—E. A. SANDERS, Stoke House, Exeter, red and white, 3 w., 1 d.; s., Cavalier (700); d., Florence of the Mourants (4191).

\* Given by the English Jersey Cattle Society.

**II. (£10.)**—Sir A. ACLAND HOOD, Bart., M.P., St. Audries, Bridgwater, lemon and white, **Amateur 2nd** (861, P.S.), 2 y., 7 m., 2 w., 4 d., bred by T. Mahy, Calais, St. Martin's, Guernsey; s., **Amateur** (662, P.S.); d., Hubits (1434, P.S.).

**III. (£5.)**—Sir H. D. TICHBORNE, Bart., Tichborne Park, Alresford, pale red and white, **Guess** (615), 3 y., 2 w., 5 d., bred by C. Le Page, Nafbrause, Guernsey; s., **Fearless** (466); d., **Fragrant Lass** (1877, R.G.A.S.).

**R. & H. C.**—C. BARFOOT, Lake, Bishopstoke, Hants, **Socialist** (586, E.G.H.B.), 3 y., 2 m., 3 d.; s., **Squire of Figtree** (370, E.G.H.B.); d., **Cherry White 3rd** (722, E.G.H.B.); s. of d., **Golden Fleece** (214, R.G.A.S.).

**CLASS 60.—Guernsey Bull, calved in 1893. [7 entries.]**

**I. (£15.)**—W. A. GLYNN, Seagrove, Seaview, Isle of Wight, orange fawn and white, **Frolic 5th** (612), 2 y., 1 m., 3 w., 1 d.; s., **The General** (444); d., **Fisky** (357).

**II. (£10.)**—W. H. FOWLER, Claremont, Taunton, fawn, **Claremont Duke** (664, E.G.H.B.), 1 y., 10 m., 3 w., 1 d., bred by F. Renaud, St. Hélène, St. Andrew's, Guernsey; s., **Willing**; d., **Lady of St. Hélène II.**

**III. (£5.)**—W. MADDICK, South Wonford, Heavitree, **Nimrod**, 1 y., 11 m., 3 w., 3 d.; s., **Nimble 2nd**; d., **Rosy**; s. of d., **Laddy**.

**R. & H. C.**—Hon. Mrs. A. B. HAMILTON, Combs, Stowmarket, Suffolk, red and white, **Royal Governor of L'Etiennerie**, 1 y., 8 m., 1 w., 1 d., bred by T. Le Prevost, L'Etiennerie, Castel, Guernsey; s., **Lord Mortimer 2nd** (743, P.S., R.G.H.B.); d., **Beauty 2nd** (1037, P.S., R.G.H.).

**CLASS 61.—Guernsey Bull, calved in 1894. [7 entries.]**

**I. (£15.)**—J. H. HOWARD, Goldenhayes, Bartley, Totton, red and white, **Papaver**, 11 m., 4 w., 1 d.; s., **Signalman** (1036, E.G.H.B.); d., **Poppy 2nd** (1151, E.G.H.B.); s. of d., **Pepin 2nd** (108, E.G.H.B.).

**II. (£10.)**—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Sir Francis 3rd**, 1 y., 4 m., 2 w.; s., **Sir Francis 2nd** (440); d., **Constance** (751).

**III. (£3.)**—Sir H. D. TICHBORNE, Bart., Tichborne Park, Alresford, red and white, **Active Lad** (653), 1 y., 3 m., 1 w., bred by A. Mansell, St. Andrew's, Guernsey; s., **Mimic** (787, R.G.A.S.); d., **Minnie 8th** (2723, R.G.A.S.).

**R. & H. C.**—Mrs. H. C. STEPHENS, Avenue House, Finchley, Middlesex, orange fawn and white, **Lemon** (691, E.G.H.B.), 11 m., 3 w., 5 d.; s., **May Boy** (346, E.G.H.B.); d., **Citron Blossom** (1243).

**CLASS 62.—Guernsey Cow, in-Milk or in-Calf, calved before 1892. [13 entries.]**

**I. (£15.)**—W. MADDICK, South Wonford, Heavitree, yellow and white, **Miss Evelyn**, 7 y., 8 m., bred by Colonel Walrond, M.P., Cullompton, Devon; s., **The Earl**; d., **Miss Evelyn**; s. of d., **Hero**.

**II. (£10.)**—W. A. GLYNN, Seagrove, Seaview, near Ryde, orange fawn and white, **Jessica**, 9 y., 8 m., 3 w., 4 d.; s., **Bonnie Boy**; d., **Jessie 2nd**.

**III. (£3.)**—J. STEPHENS, Grove House, Finchley, Middlesex, red and white, **Mountain Maid 2nd** (871, E.G.H.B.), 9 y., 11 m., 2 w., 5 d., bred by J. Le Poidevin, St. Sampson's, Guernsey; s., **Aquilon** (177, R.G.A.S.), d., **Mountain Maid** (1617, R.G.A.S.).

**R. & V. H. C.**—J. STEPHENS, orange fawn and white, **Muriel** (1132, E.G.H.B.), 9 y., 8 m., 2 w., 3 d., bred by H. Abrahams, Bronet, St. Peter's Port, Guernsey; s., Climax (14, E.G.H.B.); d., Whitey (1603, G.H.B.).

**V. H. C.**—J. C. FORSTER, Clatford Mills, Andover, fawn and white, **Clover of La Lande** (No. 1891, F.S., R.G.A.S.), 7 y., 11 m., 2 w., 5 d., bred by J. Martel, Haut Pavé, Castel :—W. H. FOWLER, Claremont, Taunton, fawn and white, **Claremont Mabel** (2629, E.G.H.B.), 3 y., 6 m., 5 d., bred by J. A. Naftel, Lohiers, St. Saviour's, Guernsey; s., Duke of Marlborough (477, P.S., R.G.H.B.); d., Nelly des Lohiers 2nd (1202, P.S., R.G.H.B.) :—and for his fawn and white, **Claremont Joan** (2704, E.G.H.B.), 4 y., 11 m., bred by F. Hubert, Les Mielles Vale, Guernsey; s., True Blue; d., Ruby (3295, G.H.B.) :—and for his red and white, **Claremont Ethel Mary** (2660, E.G.H.B.), 4 y., 3 m., 1 w., 6 d., bred by C. Pretty, La Planque, St. Peter's Port, Guernsey; s., Lord Beaconsfield 2nd (699, P.S., R.G.H.S.); d., Dairy-maid of La Floss (306, F.S., R.G.H.S.) :—and for his red and white, **Claremont Jessie** (2625, E.G.H.B.), 4 y., 2 m., 2 w., bred by J. Druce, Grande Rue Farm, St. Martin's, Guernsey; s., Power (602, P.S., R.G.H.B.); d., Oasis (378, P.S., R.G.H.B.) :—W. A. GLYNN, orange fawn and white, **Honesty 3rd**, 9 y., 3 m., 3 w., 2 d.; s., Champion; d., Honesty :—Hon. Mrs. A. B. HAMILTON, Combs, Stowmarket, pale red, **Splendide** (3382, P.S., R.G.H.S.), 7 y., 3 m., 4 w., bred by P. Priaux, Vrangue, Guernsey; s., Jubilee (390, G.S., R.G.H.S.); d., Splendide 2nd (1439, F.S., R.G.H.S.); s. of d., Island Bull :—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn, **Duchess of Worth**, 5 y., 3 m., 1 w., bred by E. G. Tarade, Guernsey; s., Billy; d., Piecoco :—and for his fawn and white, **Fortuna**, 9 y., 1 m., 2 w., bred by A. Rentoul; s., Hopeful (25); d., Blossom (21).

*Special Prize, given by the English Guernsey Cattle Society, Best Pair of Guernsey Cows in Class 62.*

**I.** (Silver Cup, value £5.)—J. STEPHENS, Grove House, Finchley, Middlesex, red and white, **Mountain Maid 2nd** (871, E.G.H.B.), 9 y., 11 m., 2 w., 5 d., bred by J. Le Poidevin, St. Sampson's, Guernsey; s., Aquilon (177, R.G.A.S.); d., Mountain Maid (1617, R.G.A.S.) :—and his orange fawn and white, **Muriel** (1132, E.G.H.B.), 9 y., 8 m., 2 w., 3 d., bred by H. Abrahams, Bronet, St. Peter's Port, Guernsey; s., Climax (14, E.G.H.B.); d., Whitey (1603, G.H.B.).

**R.**—W. A. GLYNN, Seagrove, Seaview, near Ryde, orange fawn and white, **Jessica**, 9 y., 8 m., 3 w., 4 d.; s., Bonnie Boy; d., Jessie 2nd :—and his orange fawn and white, **Honesty 3rd**, 9 y., 3 m., 3 w., 2 d.; s., Champion; d., Honesty.

*CLASS 63.—Guernsey Heifer, in-Milk or in-Calf, calved in 1892.*  
[15 entries.]

**I.** (£15) and Champion (£10).—W. A. GLYNN, Seagrove, Seaview, near Ryde, orange fawn and white, **Favourite 16th**, 2 y., 11 m., 2 w., 5 d.; s., Folic 2nd (320); d., Favourite 11th (1288).

**II.** (£10).—W. H. FOWLER, Claremont, Taunton, red and white, **Claremont Phyllis** (2631, E.G.H.B.), 2 y., 10 m., 3 w., 2 d., bred by N. Duguein, Fauconnaires, St. Andrew's, Jersey; s., Lord Eveleigh (576, P.S., E.G.H.B.); d., Marcelle 3rd (1650, P.S., R.G.H.B.).

\* Given by the Taunton Local Committee, for the Best Guernsey Heifer, in-Milk in Class 63, 64, or 65.



**III. (£3).**—W. MADDICK, South Wonford, Heavitree, yellow, **Golden Queen**, 3 y., 1 m., 5 d.; s., Norman of the Lohiers; d., Rosy; s. of d., The Earl.

**R. & V. H. C.**—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn, **Darling of Worth** (4674), 3 y., 4 m., bred by W. Le Ray, Guernsey; s., Billy; d., Darling.

**V. H. C.**—J. C. FORSTER, Clatford Mills, Andover, red and white, **Clatford Spot 2nd**, 2 y., 9 m., 4 w., 1 d.; s., Royal Star (436, E.G.H.B.); d., Clatford Spot (1246, E.G.H.B.):—and J. F. HICKS, Freemantle, Southampton, yellow and white, **Jane** (4601), 2 y., 10 m., 5 d., bred by D. Le Cras, Grande Rue, Guernsey; s., Rival; d., Flora.

**H. C.**—FOWLER and DE LA PERRELLE, Southampton, red and white, **Nelly des Lohiers VIII.** (2538, G.H.B.), 2 y., 11 m., bred by J. Naftel, Guernsey; s., Governor of L'Etiennerie (641, G.H.B.); d., Nelly des Lohiers I. (1037 G.H.B.).

**CLASS 64.—Guernsey Heifer, calved in 1893. [13 entries.]**

**I. (£10).**—W. H. FOWLER, Claremont, Taunton, fawn, **Claremont Hilda** (late **Advance**, 4636, G.H.B.), 2 y., 4 m., 1 w., 3 d., bred by H. Mace, Bailleuls, St. Andrew's, Guernsey; s., Pas Mal; d., Dolly Rose (2004, G.H.B.).

**II. (£5).**—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn, **Daisy of Worth**, 2 y., 4 m., bred by F. G. Towde, Guernsey; s., Avail; d., Rosy.

**III. (£3).**—FOWLER and DE LA PERRELLE, Southampton, fawn and white, **Advance** (4678, G.H.B.), 2 y., 4 m., bred by E. Le Page, Guernsey; s., Sanguine; d., Cameron.

**R. & H. C.**—Sir A. ACLAND HOOD, Bart., St. Audrics, Bridgwater, lemon and white, **Daisy Belle 2nd** (4637, P.S.), 2 y., 4 m., 3 w., 4 d., bred by T. W. Horton, St. Andrew's, Guernsey; s., Beaconfield (845, P.S.); d., Daisy Belle 1st.

**H. C.**—FOWLER and DE LA PERRELLE, red and white, **Bright Stamp** (4679, G.H.B.), 2 y., 4 m., bred by E. Le Page, Guernsey; s., Consul; d., Daisy:—and Sir F. A. MONTEFIORE, Bart., fawn and white, **Lily of the Bridge 2nd** (4668), 2 y., 4 m., bred by J. Hamley, Guernsey; s., Surprise of the Capelles (283); y., Lilly of the Bridge.

**CLASS 65.—Guernsey Heifer, calved in 1894. [9 entries.]**

**I. (£10).**—Mrs. H. C. STEPHENS, Avenue House, Finchley, Middlesex, orange fawn and white, **Citron Blossom 11th** (2621, E.G.H.B.), 1 y., 2 w.; s., May Boy (346, E.G.H.B.); d., Citron Blossom 4th (1512, E.G.H.B.).

**II. (£5).**—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn and white, **Marguerite 3rd**, 1 y., 2 w.; s., Sir Francis 2nd (440); d., Marguerite (1382).

**III. (£3).**—Sir A. A. HOOD, Bart., M.P., St. Audries, Bridgwater, lemon fawn and white, **Bessey 3rd** (4638, G.H.B.), 1 y., 4 m., 2 d., bred by N. Moullin Bessieres, St. Peter's Port, Guernsey; s., Folly Boy (822, P.S.); d., Bessey.

**R. & H. C.**—W. H. FOWLER, Claremont, Taunton, fawn, **Claremont Laura II.** (2628, E.G.H.B.), 1 y., 2 w., 4 d.; s., Guess (214, P.S., R.G.H.B.); d., Claremont Laura 1; s. of d., Amateur.

**H. C.**—J. C. FORSTER, Clatford Mills, Andover, red and white, **Clatford Spot 3rd**, 1 y., 3 w., 5 d.; s., Jove (621, E.G.H.B.); d., Clatford Spot 2nd (2112, E.G.H.B.); s. of d., Royal Star (436, E.G.H.B.);—and W. A. GLYNN, Seagrove, Seaview, near Ryde, orange fawn and white, **Fisky 6th**, 11 m., 4 d.; s., Island Bull; d., Fisky.

**C.**—C. BARFOOT, Lake Bishopstoke, Hants, lemon fawn and white, **Novelty** (2773, E.G.H.B.), 1 y., 4 m., 4 w.; s., Norman of the Lohiers (563, E.G.H.B.); d., Fashion (1849, E.G.H.B.); s. of d., Squire of Figres (370, E.G.H.B.);—and for his lemon fawn and white, **Norma** (2772, E.G.H.B.), 1 y., 4 m., 3 w., 5 d.; s., Norman of the Lohiers (563, E.G.H.B.); d., Gentrice (561, E.G.H.B.); s. of d., Excelsior 7th (111, P.S., R.G.A.S.).

*Special Prize, given by the English Guernsey Cattle Society, for the Best Pair of Guernsey Heifers in Class 63, 64, or 65.*

**I.** (Silver Cup, value £5.)—W. H. FOWLER, Claremont, Taunton, fawn, **Claremont Hilda** (late **Advance**, 4636, G.H.B.), 2 y., 4 m., 1 w., 3 d., bred by H. Mace, Baillouls, St. Andrew's, Guernsey; s., Pas Mal; d., Dolly Rose (2004, G.H.B.);—and his pale red and white **Claremont Olive** (late **Primrose De L'Epinel** (4635, G.H.B.), 2 y., 1 m., 3 w., 6 d., bred by F. Toode, L'Epinel Faest, Guernsey; s., Cogent; d., Polly.

**R.** Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn, **Princess May** (3108), 2 y., 7 m., bred by E. H. Weadon, Guernsey; s., Industrious (719); d., Princess May (2915);—and his fawn **Darling of Worth** (4674), 3 y., 4 m., bred by W. Le Ray, Guernsey; s., Billy; d., Darling.

#### BUTTER TEST PRIZES.

(Given by the English Guernsey Cattle Society.)

*Cow or Heifer in the Guernsey Classes, eligible for the Guernsey Herd Book, yielding the largest quantity of Butter by the practical Test of the Separator and Churn. [4 entries.]*

**I.** (Gold Medal and £3.)—W. H. FOWLER, Claremont, Taunton, red and white, **Claremont Jessie** (2625, E.G.H.B.), 4 y., 2 m., 2 w., bred by J. Druce, Grande Rue Farm, St. Martin's, Guernsey; s., Power (602, P.S., R.G.H.B.); d., Oasis (378, P.S., R.G.H.B.).

**II.** (Silver Medal and £3.)—J. STEPHENS, Grove House, Finchley, Middlesex, red and white, **Mountain Maid 2nd** (871, E.G.H.B.), 9 y., 11 m., 2 w., 5 d., bred by J. Le Poidevin, St. Sampson's, Guernsey; s., Aquilon (177, R.G.A.S.); d., Mountain Maid (1617, R.G.A.S.).

**III.** (Bronze Medal and £3.)—Sir F. A. MONTEFIORE, Bart., Worth Park, Crawley, fawn, **Duchess of Worth**, 5 y., 3 m., 1 w., bred by E. G. Toode, Guernsey; s., Billy; d., Piecoce.

#### ABERDEEN-ANGUS.

**CLASS 66.**—*Aberdeen-Angus Bull, calved in 1892, 1893, or 1894.*  
[2 entries.]

**£10.**—Col. W. N. TUFNELL, Langleys, Great Waltham, Chelmsford, Essex, **Eureka**, 2 y., 3 m., 1 w., 6 d., bred by C. W. Schroeter, Tedfold, Bignor, Sussex; s., Jolly Julian (9286); d., Kenochtry Erica (1631);—and **Constance** (5948).

**CLASS 67.—Aberdeen-Angus Cow or Heifer, in-Milk or in-Calf, of any age. [2 entries.]**

**I. (£10).**—W. B. GREENFIELD, Haynes Park, Bedford, black, **Queen of Haynes 2nd** (18,018), 4 y., 5 m., 3 w., 5 d.; s., King of Paris (6869); d., Gilmeny 2nd (4780); s. of d., Albany (1354).

**R. & H. C.**—L. A. MACPHERSON, Wyrley Grove, Pelsall, Staffordshire, black, **Sunrise of Advie** (21,851), 2 y., 4 m., 6 d., bred by Mr. Grant, Advie Mains, Strathspey; s., Edonus (5998); d., Sunbeam of Advie (13,731); . of d., Jupiter of Aberlour (2173).

**KERRY.**

**CLASS 68.—Kerry Bull, calved in 1892, 1893, or 1894. [8 entries.]**

**I. (£10).**—C. ADEANE, Brabraham Hall, Cambridge, black, **Burns**, 11 m., 1 d.; s., St. Patrick; d., Blarney (1504); s. of d., Blackmoor (246).

**II. (£5).**—M. J. SUTTON, Kidmore Grange, near Reading, black, **Kidmore Flora King**, 2 y., 2 w., 5 d.; s., Eudas Glory (199 Roy., Dublin I.B.); d., Flora (13); s. of d., Shaun an Scoop.

**III. (£2), and Special (£5 5s.)\***—MARQUIS OF LANSDOWNE, Bowood, Calne, Wiltshire, black, **Odugan**, 3 y., 3 m., 3 w., 4 d., bred by Viscount de Vesci, Abbeyleix, Ireland; s., Gort Admiral (140); d., Lady Georgina (523); s. of d., Feale 8th.

**R., V. H. C., and R. for Special.\***—M. J. SUTTON, **King of Killarney**, 1 y., 1 m., 2 w., 3 d.; s., Eudas Glory; s. of d., Killarney (1091).

**V. H. C.**—DUCHESS OF NEWCASTLE, Clumber, Worksop, Nottinghamshire, black, **MacSheen**, 3 y., 3 m., 1 w., 1 d., bred by P. Mahoney, Kilmorna, Co. Kerry; s., Curoi (66); d., Sheen II. (an Dora, 828); s. of d., Aberlow (11).

**H. C.**—MARQUIS OF LANSDOWNE, black, **Aedh Ruadh**, 1 y., 8 m., 6 d., bred by Viscount de Vesci; s., Feale 8th; d., Macha 2nd.

**CLASS 69.—Kerry Cow or Heifer, in-Milk or in-Calf, of any age. [15 entries.]**

**I. (£10).**—M. J. SUTTON, Kidmore Grange, near Reading, black, **Violet** (896), 9 y.

**II. (£5).**—J. ROBERTSON, The Firs, Hatton, Warwick, black, **Nelly**, 4 y. about.

**III. (£2).**—DUCHESS OF NEWCASTLE, Clumber, Worksop, Nottinghamshire, black, **Shramrock**, 6 y., bred by J. Robertson, La Mancha, Malahide, Co. Dublin.

**R. & V. H. C.**—MARQUIS OF LANSDOWNE, Bowood, Calne, Wilts, black, **Maid of the Lake**, 7 y. about.

**H. C.**—DUCHESS OF NEWCASTLE, black, **Sheen V.**, 4 y., 1 m., 1 w., bred by P. Mahoney, Kilmorna, Co. Kerry; s., The O'Dowd (112); d., Sheen II. (an Dora, 828); s. of d., Aherlow (11):—H. PARSONS, Misterton, Crewkerne, black, **Pomare**, 3 y., 3 m., 4 w., 1 d.; s., MacMurra; d., Pretty Maid:—and for his black **Penelope**, 2 y., 11 m., 3 w., 3 d.; s., MacMura; d., Princess;

\* Given by the Kerry and Dexter Cattle Society, for the Best Animal in Class 68 or 69, whose Sire and Dam were entered in the Herd Book.

s. of d., Pat :—and M. J. SUTTON, black, **Peep the 3rd**, 3 y., 4 m., 2 w., 3 d.; s., Colorado (63); d., Peep (732).

C.—C. ADEANE, Babraham Hall, Cambridge, black, **Bride**, 3 y., 1 m., 3 w., 4 d.; s., Mentmore (90); d., Blackberry II. (161):—and H. PARSONS, black, **Pretty One**, 5 y., 3 w., 4 d.; s., Pat; d., Pretty Maid.

### DEXTER KERRY.

CLASS 70.—*Dexter Kerry Bull, calved in 1892, 1893, or 1894.*  
[4 entries.]

I. (£10.)—J. ROBERTSON, The Firs, Hatton, Warwick, black, **Tommy Dodd**, 2 y. about.

II. (£5), and R. for Special.\*—F. H. BAXENDALE, Framfield Place, Framfield, S.O., Sussex, black, **Framfield Don**, 1 y., 5 m., 1 w., 4 d.; s., Kidmore Paradox II. (59); d., Daphne (448).

R. & V. H. C.—M. J. SUTTON, Kidmore Grange, near Reading, black, **Othello 3rd**, 3 y., 1 m., 4 w., 2 d.; s., Othello (63); d., Red Rose (178).

V. H. C.—LORD ASHBURTON, The Grange, Alresford, Hampshire, black, **The Grange Hero**, 3 y., 7 d.; s., Chang (vol. i., R.D.); d., Mavourneen (vol. i., R.D.S.H.B.).

CLASS 71.—*Dexter Kerry Cow or Heifer, in-Milk or in-Calf, of any age.* [14 entries.]

I. (£10.)—M. J. SUTTON, Kidmore Grange, near Reading, red, **Red Rose** (178), 9 y.

II. (£5), and Special (£5 5s.)\*—LORD ASHBURTON, The Grange, Alresford, Hants, black, **Rosalin**, 5 y., 1 m., bred by R. Barter, St. Ann's Hill, Cork.

III. (£2.)—LORD ASHBURTON, black, **Mavourneen**, 8 y., 6 m.

R. & V. H. C.—Rev. R. H. MAUNSELL-EYRE, The Vicarage, Congresbury, black, **Snowdrop**, 5 y., less 3 d., bred by W. Shaul, Caherciveen, Co. Kerry: s., Lord Lokar (Herd Book, 89–91).

V. H. C.—M. J. SUTTON, black, **Seline II.**, 4 y., 5 m., 3 w., 2 d.; s., Paradox; d., Seline (189).

H. C.—F. H. BAXENDALE, Framfield Place, Framfield, S.O., Sussex, black, **Dot II.**, 4 y., 11 m., 3 w., 4 d., bred by Aylesbury Dairy Company, Stammerham, Horsham; s., Paradox; d., Dot :—Rev. R. H. MAUNSELL-EYRE, black, **Snowdrop II.**, 2 y., 3 w., 1 d., bred by P. Hay, Silverdale, Queenstown, Co. Cork :—J. ROBERTSON, The Firs, Hatton, Warwick, black little white, **Asperula** :—J. ROBERTSON, La Mancha, Malahide, Co. Dublin, black, **Calandula** :—and M. J. SUTTON, red, **Peach 3rd**, 3 y., 8 m.; s., Paradox; d., Peach (161).

—Miss L. CHICHESTER, Calverleigh Court, Tiverton, Devon, black, **Annella**, 3 y. :—and Mr. J. ROBERTSON, black little white, **Calandrina**.

Given by the Kerry and Dexter Cattle Society, for the Best Animal in the class for 7 years or 7 months and 21 days and 10 months and 10 days were entered in the Herd Book.

## SHEEP.

### LEICESTER.

#### CLASS 72.—*Leicester Shearling Ram.* [9 entries.]

- I. (£10.)—G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, 7., 2 m., 2 w.  
II. (£5.)—T. YELLAND, Nanphysick, St. Austell, Cornwall, 1 y., 2 m., v.  
III. (£2.)—G. HARRISON, 1 y., 2 m., 2 w.  
R. & H. C.—G. HARRISON, 1 y., 2 m., 2 w.

#### CLASS 73.—*Pair of Leicester Ram Lambs, dropped in 1895.* [6 entries.]

- I. (£10.)—G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, 1., 2 w.  
II. (£5.)—T. YELLAND, Nanphysick, St. Austell, Cornwall, 2 m., 2 w.,  
-  
III. (£2.)—T. YELLAND, 2 m., 1 w., 3 d.  
R.—Mrs. PERRY-HERRICK, Beau Manor Park, near Loughborough, 2 m., w. about.

#### CLASS 74.—*Pen of Three Leicester Shearling Ewes.* [7 entries.]

- I. (£10.)—G. HARRISON, Underpark, Lealholm, Grosmont, Yorkshire, 7., 2 m., 2 w.  
II. (£5.)—G. HARRISON, 1 y., 2 m., 2 w.  
III. (£2.)—Mrs. PERRY-HERRICK, Beau Manor Park, near Loughborough, 7., 2 m., 2 w. about.  
R.—Mrs. PERRY-HERRICK, 1 y., 2 m., 2 w. about.

### COTSWOLD.

#### CLASS 75.—*Cotswold Shearling Ram.* [2 entries.]

- I. (£10.)—T. R. HULBERT, North Cerney, Cirencester, 1 y., 3 m., 2 w.  
II. (£5.)—T. R. HULBERT, 1 y., 3 m., 2 w.

#### CLASS 76.—*Pair of Cotswold Ram Lambs, dropped in 1895.* [4 entries.]

- I. (£10.)—F. CRADDOCK, Eastington, Northleach, Glcs., 17 w.  
II. (£5.)—F. CRADDOCK, 17 w.  
R.—T. R. HULBERT, North Cerney, Cirencester, 3 m., 1 w.

xxxii *Prizes awarded to Devon Long-woolled and Southdown Sheep.*

**CLASS 77.—*Pen of Three Cotswold Shearling Ewes.* [2 entries.]**

**I. (£10.)**—T. R. HULBERT, North Cerney, Cirencester, 1 y., 2 m., 3 w.

**II. (£5.)**—T. R. HULBERT, 1 y., 2 m., 3 w.

**DEVON LONG-WOOL.**

**CLASS 78.—*Devon Long-Wool Shearling Ram.* [15 entries.]**

**I. (£10) and Champion (£5.)\***—N. COOK, Chevithorne, Tiverton, Devon, 1 y., 3 m., 2 w.

**II. (£5.)**—N. COOK, 1 y., 3 m. 2 w.

**III. (£2.)**—N. COOK, 1 y., 3 m., 3 w.

**R.**—J. WHITE, Torweston, Williton, Somerset, 1 y., 2 m.

**CLASS 79.—*Pair of Devon Long-Wool Ram Lambs, dropped in 1895.* [5 entries.]**

**I. (£10.)**—N. COOK, Chevithorne, Tiverton, 3 m., 3 w.

**II. (£5.)**—A. C. SKINNER, Pound Farm, Bishop's Lydeard, Taunton, 4 m. about.

**CLASS 80.—*Pen of Three Devon Long-Wool Shearling Ewes.* [7 entries.]**

**I. (£10.)**—C. G. THORNE, Cardon, Williton, Somerset, 1 y., 3 m.

**II. (£5.)**—N. COOK, Chevithorne, Tiverton, 1 y., 3 m., 3 w.

**III. (£2.)**—J. WHITE, Torweston, Williton, Somerset, 1 y., 3 m.

**R.**—J. WHITE, 1 y., 3 m.

**SOUTHDOWN.**

**CLASS 81.—*Southdown Shearling Ram.* [9 entries.]**

**I. (£10) and R. for Champion.†**—H.R.H. THE PRINCE OF WALES, K.G., Sandringham, Norfolk, 1 y., 3 m.

**II. (£5.)**—E. ELLIS, Summersbury Hall, Shalford, Guildford, 1 y., 3 m., 2 w.

**III. (£2.)**—H.R.H. THE PRINCE OF WALES, K.G., 1 y., 3 m.

**R. & H. C.**—J. BLYTH, Blythwood, Stansted, Essex, 1 y., 3½ m. about.

**H. C.**—J. BLYTH, 1 y., 3½ m.

**C.**—E. ELLIS, 1 y., 3 m., 2 w.

**CLASS 82.—*Pair of Southdown Ram Lambs, dropped in 1895.* [6 entries.]**

**(£10) and Champion (£5.)†**—E. ELLIS, Summersbury, Shalford, Guildford, 4 m.

**II. (£5.)**—E. ELLIS, 4 m.

**III. (£2.)**—J. BLYTH, Blythwood, Stansted, Essex, 3½ m. about.

\* Given by the Taunton Local Committee for the Best Ram or Ram Lamb in Class 78 or 79.

† Given by the Taunton Local Committee, for the Best Ram or Ram Lamb in Class 81 or 82.

**L. & H. C.**—H.R.H. THE PRINCE OF WALES, K.G., Sandringham, Norfolk, 1., 2 w.

**I. C.**—EARL BATHURST, Cirencester Park, Cirencester, 3 m., 2 w. about.

**CLASS 83.**—*Pen of Three Southdown Shearling Ewes.* [7 entries.]

**L. (£10)** and **Champion** (Piece of Plate value £10.)\*—E. ELLIS, Summers-y Hall, Shalford, Guildford, 1 y., 3 m., 2 w.

**I. (£5.)**—J. BLYTH, Blythwood, Stansted, Essex, 1 y., 3½ m. about.

**II. (£2.)**—EARL BATHURST, Cirencester Park, Cirencester, 1 y., 3 m.,

**L. & V. H. C.**—H.R.H. THE PRINCE OF WALES, K.G., Sandringham, Norfolk, 1 y., 3 m.

**I. C.**—EARL BATHURST, 1 y., 3 m., 2 w.

**2.**—Sir W. THROCKMORTON, Bart., Buckland, Faringdon, 1 y., 3 m., 1 w.

### HAMPSHIRE DOWN.

**CLASS 84.**—*Shearling Hampshire Down Ram.* [12 entries.]

**L. (£10)** and **R.** for **Champion**.†—Prof. WRIGHTSON, College of Agriculture, Downton, Salisbury, **Cambuscan** (168, F.B.), 1 y., 4 m., 2 w.

**I. (£5.)**—W. T. TWIDELL, May's Farm, Crowmarsh, Wallingford, 1., 4 m.

**II. (£2.)**—J. BARTON, Hackwood Farm, Basingstoke, 1 y., 4 m.

**3. & C.**—LORD ROTHSCHILD, Tring Park, Herts, 1 y., 4 m., 2 w. about.

**CLASS 85.**—*Pair of Hampshire Down Ram Lambs, dropped in 1895.* [15 entries.]

**L. (£10)** and **Champion (£5.)**†—A. DE MORNAY, Col. d'Arbres, Wallingford, 4 m., 3 w., 3 d.

**II. (£5.)**—J. FLOWER, Chilmark, Salisbury, 4 m., 2 w.

**III. (£2.)**—E. WHALLEY-TOOKER, Hinton Daubnay, Horndean, Hants, 1., 1 w.

**R. & H. C.**—J. BARTON, Hackwood Farm, Basingstoke, 4 m., 2 w.

**C.**—J. FLOWER, 4 m., 2 w. :—R. PORTSMOUTH, Sherborne St. John, Basingstoke, 4 m., 2 w. :—LORD ROTHSCHILD, Tring Park, Herts, 4 m., 1 w. :—E. WHALLEY-TOOKER, 4 m., 1 w. :—and Prof. WRIGHTSON, College of Agriculture, Downton, Salisbury, 4 m., 1 w.

**CLASS 86.**—*Pen of Three Hampshire Down Shearling Ewes.* [6 entries.]

**I. (£10)** and **R.** for **Champion**.\*—J. FLOWER, Chilmark, Salisbury, 1 y., 2 w.

**II. (£5.)**—A. DE MORNAY, Col. d'Arbres, Wallingford, 1 y., 4 m., 3 w.

\* Given by the Proprietor of Corner's Oils, for the Best Pen of three Shearling ewes in any of the Sheep Classes.

† Given by the Taunton Local Committee, for the Best Ram or Ram Lamb in classes 84 or 85.

- III. (£2).**—LORD ROTHSCHILD, Tring Park, Herts, 1 y., 4 m., 2 w. about.  
**R. & H. C.**—J. FLOWER, 1 y., 4 m., 2 w.

**SHROPSHIRE.****CLASS 87.\*—*Shropshire Shearling Ram.* [34 entries.]**

- I. (£10).**—W. F. INGE, Thorpe Hall, Tamworth, 1 y., 3 m. about.  
**II. (£5).**—A. E. MANSELL, Harrington Hall, Shifnal, 1 y., 3 m., 2 w.  
**III. (£3).**—G. L. FOSTER-HARTER, Puckrup Hall, Tewkesbury, 1 y., 2 m.  
**IV. (£2).**—R. P. COOPER, Shenstone Court, Lichfield, 1 y., 3 m., 1 w., 2 d.  
**R.** Mrs. M. BARRS, Odstone Hall, Atherstone, 1 y., 2 m., 2 w. about.  
**H. C.**—J. BEACH, The Hattons, Wolverhampton, 1 y., 2 m., 2 w. :—  
 A. S. BERRY, Pheasey Farm, Great Barr, Birmingham, 1 y., 2 m., 3 w. about :—  
 R. P. COOPER, 1 y., 3 m., 2 w., 2 d. :—  
 Gen. R. DYOTT, Freeford Hall, Lichfield, 1 y., 2 m., 3 w. :—  
 A. E. MANSELL, 1 y., 3 m., 2 w. :—  
 P. L. MILLS, Ruddington Hall, Nottingham, 1 y., 2 m. :—  
 and H. TOWNSEND, Caldecote Hall, Nuneaton, 1 y., 2 m., about.  
**C.**—T. BEACH, The Hattons, Wolverhampton, 1 y., 2 m., 1 w. :—  
 A. S. BERRY, 1 y., 2 m., 3 w. about :—  
 J. BOWEN-JONES, Ensdon House, Montford Bridge, Shropshire, 1 y., 3 m. about :—  
 and his 1 y., 3 m. about :—  
 T. FENN, Stonebrook House, Ludlow, 1 y., 2 m., 2 w. :—  
 W. KIRKHAM, Bangley Farm, Tamworth, 1 y., 3 m. :—  
 A. E. MANSELL, 1 y., 3 m., 2 w. :—  
 P. L. MILLS, 1 y., 2 m. :—  
 T. S. MINTON, Mintford, Shrewsbury, 1 y., 3 m. :—  
 and H. C. G. PARKER, Brockton Grange, Shifnal, 1 y., 3 m., 2 w.

**CLASS 88.—*Pair of Shropshire Ram Lambs, dropped in 1895.* [11 entries.]**

- I. (£10).**—G. L. FOSTER-HARTER, Puckrup Hall, Tewkesbury, 2 to 3 m.  
**II. (£5).**—J. BEACH, The Hattons, Wolverhampton, 3 m., 2 w.  
**III. (£2).**—R. P. COOPER, Shenstone Court, near Lichfield, 3 m.  
**R. & H. C.**—W. KIRKHAM, Bangley Farm, Tamworth, 3 m. about.  
**H. C.**—W. F. INGE, Thorpe Hall, Tamworth, 3 m. about :—  
 P. L. MILLS, Ruddington Hall, Nottingham, 3 m. about :—  
 and H. C. G. PARKER, Brockton Grange, Shifnal, 3 m., 1 w.  
**C.**—R. P. COOPER, 3 m. :—  
 A. E. MANSELL, Harrington Hall, Shifnal, 3 m., 2 w. :—  
 and his 3 m. 2 w. :—  
 and H. C. G. PARKER, 3 m., 1 w.

**CLASS 89.\*—*Pen of Three Shropshire Shearling Ewes.* [14 entries.]**

- I. (£10).**—Mrs. M. BARUS, Odstone Hall, Atherstone, 1 y., 2 m., 2 w. about.  
**II. (£5).**—P. L. MILLS, Ruddington Hall, Nottingham, 1 y., 2 m.  
**III. (£3).**—G. L. FOSTER-HARTER, Puckrup Hall, Tewkesbury, 1 y., 2 m., bred by Exhibitor and T. and S. Bradburne, Wheeley Moor, Coleshill.  
**IV. (£2).**—W. F. INGE, Thorpe Hall, Tamworth, 1 y., 3 m. about.

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\* The 3rd and 4th Prizes in Classes 87 and 89 were given by the Shropshire Sheep Breeders' Association.



*Prizes awarded to Somerset and Dorset Horn Sheep.*    xxxv

**& H. C.**—HOWARD P. RYLAND, Moxhull Park, Erdington, Birmingham, 2 m., 3 w. about.

**C.**—J. BEACH, The Hattons, Wolverhampton, 1 y., 2 m., 2 w.:—A. S. x, Pheasey Farm, Great Barr, Birmingham, 1 y., 2 m., 3 w. about:—OWEN-JONES, Ensdon House, Montford Bridge, Shropshire, 1 y., 3 m. t:—R. P. COOPER, Shenstone Court, near Lichfield, 1 y., 3 m., 2 w.:—W. KIRKHAM, Bangley Hall, Tamworth, 1 y., 3 m.

—T. FENN, Stonebrook House, Ludlow, 1 y., 2 m., 2 w.

**OXFORD DOWN.**

**CLASS 90.**—*Oxford Down Shearling Ram.* [5 entries.]

(£10.)—A. BRASSEY, Heythrop Park, Chipping Norton, **Heythrop** o, 1 y., 4 m., 2 w.

. (£5.)—A. BRASSEY, **Young Chicago**, 1 y., 4 m., 2 w.

**& H. C.**—H. W. STILGOE, The Grounds, Adderbury, near Banbury, 1 y., 4 m., 6 d.

—H. W. STILGOE, 1 y., 3 m., 2 w., 2 d.

**CLASS 91.**—*Pair of Oxford Down Ram Lambs, dropped in 1895.*  
[6 entries.]

(£10.)—A. BRASSEY, Heythrop Park, Chipping Norton, 4 m., 3 w.

. (£5.)—A. BRASSEY, 4 m., 3 w.

**L. (£2.)**—H. W. STILGOE, The Grounds, Adderbury, near Banbury, 1, 3 m., 4 w.

**& H. C.**—H. W. STILGOE, 3 m., 4 w.

**CLASS 92.**—*Pen of Three Oxford Down Shearling Ewes.*  
[1 entry.]

(£10.)—A. BRASSEY, Heythrop Park, Chipping Norton, 1 y., 4 m.

**SOMERSET AND DORSET HORN.**

**CLASS 93.**—*Somerset and Dorset Horn Shearling Ram.* [8 entries.]

(£10) and Champion (£5.)\*—W. R. FLOWER, West Stafford, Dorchester, **ver's No. 45**, 1 y., 5 m., 3 w.

. (£5.)—J. KIDNER, Nyncehead, Wellington, 1 y., 5 m., 2 w.

**L. (£2.)**—W. R. FLOWER, **Flower's No. 42**, 1 y., 4 m., 3 w., 5 d.

—J. KIDNER, 1 y., 5 m., 2 w.

**C.**—H. FARTHING, Thurloxton, Taunton, **Farthings No. 11**, 1 y., 2 w.

—J. KIDNER, 1 y., 5 m., 2 w.

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Given by the Dorset Horn Sheep Breeders' Association, for the Best Exhibit  
Dorset Horn Sheep in Class 93, 94, 95 or 96.

**CLASS 94.**—*Pair of Somerset and Dorset Horn Ram Lambs, dropped after Nov. 1st, 1894.* [2 entries.]

**I. (£10.)**—W. C. GROVES, Whitcombe Farm, Dorchester, 6 m., 1 w. about.

**R.**—W. C. GROVES, 6 m., 2 w. about.

**CLASS 95.\***—*Pen of Three Somerset and Dorset Horn Chilver Lambs.*—[1 entry.]

**I. (£7.)**—W. R. FLOWER, West Stafford, Dorchester, 5 m., 3 d.

**CLASS 96.**—*Pen of Three Somerset and Dorset Horn Shearling Ewes.* [7 entries.]

**I. (£10)** and **R.** for Champion.†—H. FARTHING, Thurloxton, Taunton, 1 y., 5 m., 2 w.

**II. (£5.)**—J. KIDNER, Nynhead, Wellington, 1 y., 5 m., 2 w.

**III. (£2.)**—H. FARTHING, 1 y., 5 m., 2 w.

**R.**—W. R. FLOWER, West Stafford, Dorchester, 1 y., 4 m., 3 w., 5 d.

**H. C.**—J. KIDNER, 1 y., 5 m., 2 w.

### EXMOOR HORN.

**CLASS 97.**—*Exmoor Horn Shearling Ram.* [4 entries.]

**I. (£10.)**—Sir W. R. WILLIAMS, Bart., Upcott House, Pilton, Barnstaple, 1 y., 2 m., 2 w.

**II. (£5.)**—J. NORMAN, Burrow, Wootton Courtney, Somerset, 1 y., 3 m., 1 w.

**R. & C.**—F. J. STANLEY, M.P., Quantock Lodge, Bridgwater, 1 y., 2 m., 29 d.

**CLASS 98.**—*Pair of Exmoor Horn Ram Lambs, dropped in 1895.* [2 entries.]

**I. (£10.)**—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, 3 m.

**CLASS 99.**—*Pen of Three Exmoor Horn Shearling Ewes.* [5 entries.]

**I. (£10.)**—Sir W. R. WILLIAMS, Bart., Upcott House, Pilton, Barnstaple, 1 y., 2 m., 3 w.

**(I. (£5.)**—E. J. STANLEY, M.P., Quantock Lodge, Bridgwater, 1 y., 2 m., 29 d.

**R. & C.**—J. NORMAN, Burrow, Wootton Courtney, Somerset, 1 y., 3 m., 29 d.

The Prize in Class 95 was given by the Somerset Agricultural Association.  
Given by the Dorset Horn Sheep Breeders' Association for the Best Exhibit  
Dorset Horn Sheep in Class 93, 94, 95 or 96.

## PIGS.

CLASSES 100 to 124.

Owing to the prevalence of Swine Fever it was not practicable to hold a Show of Pigs.

## PRODUCE.

### CIDER.

(Open to Growers or Makers.)

CLASS 125.—*Cask of not less than 18 and not more than 30 gallons of Cider, made in any year before 1894.* [7 entries.]

- I. (£4).—W. H. BATTING, Cider Stores, St. Cyres, near Exeter.
- II. (£3).—R. ROUT AND SON, Banham, Attleboro, Norfolk.
- III. (£2).—J. C. WATERMAN, Baltonsborough, Glastonbury.
- R.—H. THOMSON, Southends, Newent, Gloucestershire.
- C.—W. T. S. TILLEY, North Wootton, Shepton Mallet.

CLASS 126.—*12 Bottles of Cider, made in any year before 1894.*  
[12 entries.]

- I. (£4).—J. C. WATERMAN, Baltonsborough, Glastonbury.
- II. (£3).—R. ROUT AND SON, Banham, Attleboro, Norfolk.
- III. (£2).—H. WESTON, The Bounds, Much Marcle, Herefordshire.
- R.—STARKEY, KNIGHT AND Co., Bridgwater.

CLASS 127.\*—*Cask of not less than 18 and not more than 30 gallons of Cider, made in the Autumn of 1894.* [8 entries.]

- I. (£4).—W. T. S. TILLEY, North Wootton, Shepton Mallet.
- II. (£3).—J. C. WATERMAN, Baltonsborough, Glastonbury.
- III. (£2).—W. H. BATTING, Cider Stores, St. Cyres, near Exeter.
- R.—H. THOMSON, Southend, Newent, Gloucestershire.
- V. H. C.—H. WESTON, The Bounds, Much Marcle, Herefordshire.

CLASS 128.\*—*12 Bottles of Cider, made in the Autumn of 1894.*  
[12 entries.]

- I. (£4).—R. ROUT AND SON, Banham, Attleboro, Norfolk.
- II. (£3).—J. WATTS, BACKWELL, Bristol.

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\* The Prize in Classes 127 and 128 were given by the Somerset Agricultural Association.

**III. (£2.)**—J. WATTS.

**R.**—H. WESTON, The Bounds, Much Marcle, Herefordshire.

**H. C.**—W. H. BATTING, Cider Stores, St. Cyres, Exeter.

## CHEESE.

**CLASS 129.\*—Four Cheeses (the total weight being not less than 224 lbs.) made in 1894. [38 entries.]**

**I. (£20.)**—N. J. SIMS, Mere, Bath.

**II. (£12.)**—T. C. CANDY, Woolcombe Farm, Cattistock, Dorset.

**III. (£8.)**—MRS. W. T. S. TILLEY, North Wootton, Shepton Mallet.

**IV. (£6.)**—N. J. SIMS.

**V. (£4.)**—H. FRANCIS, Malkin Hill Farm, Horsington, Bath.

**R. & V. H. C.**—J. MARTIN, Lottisham, Glastonbury.

**H. C.**—J. R. KEEN, Chewton Farm, Ston Easton :—J. RICHARDSON, Leighton Hall, Crewe :—and C. SPICER, Blackmore Vale Dairy Company, Lydlinch.

**C.**—H. G. ASHMAN, Beacon Farm, Shepton Mallet :—J. MANFIELD, Hambridge Farm, Curry Rivell :—and C. SPICER.

**CLASS 130.—Four Cheeses (the total weight being not less than 112 lbs.) made in 1894. [25 entries.]**

**I. (£12.)**—N. J. SIMS, Mere, Bath.

**II. (£8.)**—T. C. CANDY, Woolcombe Farm, Cattistock, Dorset.

**III. (£6.)**—A. ANDREWS, Manor Farm, Todber, Blandford.

**IV. (£4.)**—C. SPICER, Blackmore Vale Dairy Company, Lydlinch.

**V. (£2.)**—J. R. KEEN, Chewton Farm, Ston Easton.

**R. & V. H. C.**—MRS. W. T. S. TILLEY, North Wootton, Shepton Mallet.

**C.**—H. FRANCIS, Malkin Hill Farm, Horsington, Bath :—F. and M. BIRCH, Lower Burrow, Kingsbury Episcopi, Ilminster :—C. SPICER :—and STEPHENS, Red House Farm, Stratton-on-the-Fosse, Bath.

**CLASS 131.—Four Cheddar Cheeses (the total weight being not less than 112 lbs.) made in 1894 by a Student who had received not less than 100 marks in one of the Society's Cheese Schools.**

**I. (£12.)**—T. C. CANDY, Woolcombe Farm, Cattistock, Dorset.

**II. (£8.)**—MRS. W. T. S. TILLEY, North Wootton, Shepton Mallet.

**III. (£6.)**—A. ANDREWS, Manor Farm, Todber, Blandford.

**IV. (£4.)**—C. SPICER, Blackmore Vale Dairy Company, Lydlinch.

**V. (£2.)**—J. R. KEEN, Chewton Farm, Ston Easton.

**R. & V. H. C.**—MRS. W. T. S. TILLEY, North Wootton, Shepton Mallet.

**C.**—H. FRANCIS, Malkin Hill Farm, Horsington, Bath :—F. and M. BIRCH, Lower Burrow, Kingsbury Episcopi, Ilminster :—C. SPICER :—and STEPHENS, Red House Farm, Stratton-on-the-Fosse, Bath.

**CLASS 129 was given by the Somerset Agricultural Society.**

- V. (£2).—Miss K. BENNETT, Church Farm, Chew Stoke, Bristol.  
R. & V. H. C.—Mrs. WARREN, Canning's Court Dairy, Pulham, Lichester.  
V. H. C.—Miss A. BENNETT, Chew Stoke, Bristol :—and Mrs. J. SHEPPY, Iwood House, Congresbury, near Bristol.  
H. C.—Miss E. JARVIS.  
C.—Mrs. R. A. PERRY :—and Mrs. J. SHEPPY.

CLASS 132.—*Four Cheeses (the total weight being not less than 112 lbs.) made in 1895. [32 entries.]*

- I. (£10).—H. G. ASHMAN, Beacon Farm, Shepton Mallet.  
II. (£8).—W. C. SPENCER, Grey Abbey, North Perrott, Crewkerne.  
III. (£5).—H. CANNON, Milton Clevedon, Evercreech.  
IV. (£3).—H. CANNON.  
V. (£2).—W. C. SPENCER.  
R. & C.—C. CANDY, Temple House, Doultling, Shepton Mallet.

CLASS 133.\*—*Four Cheeses (the total weight being not less than 112 lbs.) made in 1895 by a Student, resident in Somerset, who had received not less than a week's instruction in one of the Society's Cheese Schools. [12 entries.]*

- I. (£10).—Mrs. W. T. S. TILLEY, North Wootton, Shepton Mallet.  
II. (£8).—Mrs. W. T. S. TILLEY.  
III. (£5).—Mrs. R. A. PERRY, Godney, Wells.  
IV. (£3).—Mrs. T. J. GIDDINGS, Home Farm Dairy, Kilmington, Bath.  
V. (£2).—Mrs. R. A. PERRY.  
R. & C.—Mrs. J. SHEPPY, Iwood House, Congresbury, Bristol.

CLASS 134.—*Four Cheddar Cheeses (the total weight being not less than 112 lbs.) made in 1895 by a Student who had received not less than a week's instruction in one of the Society's Cheese Schools. [10 entries.]*

- I. (£8).—Mrs. W. T. S. TILLEY, North Wootton, Shepton Mallet.  
II. (£5).—Mrs. W. T. S. TILLEY.  
III. (£4).—Mrs. A. M. CREIGHTON, Farncombe Farm, Shepton Mallet.  
IV. (£2).—Mrs. R. A. PERRY, Godney, Wells.  
V. (£1).—Mrs. J. SHEPPY, Iwood House, Congresbury, Bristol.

CLASS 135.—*Ten Loaf, or other Truckle Cheeses, made in 1895. [17 entries.]*

- I. (£5).—Mrs. COLES, Manor Farm, Emborough, near Bath.  
II. (£4).—C. SPICER, Blackmore Vale Dairy Company, Lydlinch.

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\* The Prizes in Class 133 were given by the Somerset County Council.

**III. (£3.)**—MRS. J. SHEPPY, Iwood House, Congresbury, Bristol.

**IV. (£2.)**—C. SPICER.

**V. (£1.)**—J. A. HARDING, Rodmead, Maiden Bradley, Bath.

**R.**—W. C. SPENCER, Grey Abbey, North Perrott, Crewkerne.

**CLASS 136.**—*Four Caerphilly Cheeses, made in 1895.* [7 entries.]

**I. (£3.)**—J. BOARD, Hill Farm, East Pennard, Glastonbury.

**II. (£2.)**—J. BOARD.

**III. (£1.)**—C. RYALL, North Cadbury, Bath.

**R.**—J. R. THOMAS, Towyn, Burry Port, South Wales.

**CLASS 137.**—*Five Cream or other Soft Cheeses.* [5 entries.]

**I. (£4.)**—C. C. TUDWAY, Walcombe Dairy, Wells, Somerset.

**II. (£3.)**—LONDON, GLOUCESTER AND NORTH HANTS DAIRY COMPANY, 12 to 20, Whatley Road, Clifton.

**III. (£2.)**—FREETH AND POCOCK, South Down Farm, Surbiton Hill, Surrey.

**IV. (£1.)**—BATH AND SOMERSET DAIRY COMPANY (Limited), 3, Bladud Buildings, Bath.

## BUTTER AND CREAM.

**CLASS 138.\***—*3 lbs. of Fresh (or very slightly salted) Butter, in pound plain rolls or brick shapes, made of Cream from Cows other than Channel Island Breeds.* [41 entries.]

**I. (£5.)**—MRS. H. PIKE, Berry Barton, Branscombe, Sidmouth.

**II. (£3.)**—J. WILLIAMS, Regilbury Park, Winford, Bristol.

**III. (£2.)**—MRS. K. S. FARMER, Barrack Farm, Newport, Monmouthshire.

**IV. (£1.)**—J. CHANNON, Wishford, Broadclyst.

**R. & V. H. C.**—A. GIBBS, Tyntesfield, near Bristol.

**V. H. C.**—J. HEARD, Witheridge Dairy Company, Witheridge, Devon.

**H. C.**—LONDON, GLOUCESTER AND NORTH HANTS DAIRY COMPANY, 12 to 20, Whatley Road, Clifton :—MRS. WEBSTER, The Hermitage, Stockton-on-Tees, York :—and MRS. F. G. WILLIAMSON, Wapshotts Farm, Horrell, Woking.

**N.** ASHCROFT, Layhams Farm, Hayes, Kent :—MRS. E. CHILDS, Yeovil Dairy, Yeovil :—E. MUCKLOW, Whitstone Head, Holsworthy :—W. HOPE, Hope Farm, Falfield, Gloucestershire :—MRS. SPILLER, Ulcombe, Honiton :—HON. MRS. TREFUSIS, Thorncombe, Crowcombe, Taunton :—M. J. WILLIAMS, North Hill Farm, Chew Stoke :—and C. YEATES, Court Farm, Flax Bourton.

\* The Prizes and Cup for Class 138 were given by the Somerset Agricultural Association.

**CLASS 139.**—3 lbs. of *Fresh (or very slightly salted) Butter, in pound plain rolls or brick shapes, made of Cream from Cows of Channel Island Breeds only.* [34 entries.]

**I. (£5).**—LORD POLTIMORE, Poltimore Park, Exeter.

**II. (£3), and Special (£1.)\***—M. SETH-SMITH, Colwood Park Dairy Farm, Bolney, Sussex.

**III. (£2).**—Mrs. T. EMERY, Elm Tree Farm, Portbury.

**IV. (£1.)**—J. F. HALL, Chilcote Manor Farm, Wells, Somerset.

**R. & V. H. C.**—A. F. SOMERVILLE, Dinder, Wells, Somerset.

**V. H. C.**—Mrs. E. R. BLACKWELL, Cowden Hall, Heathfield, Sussex :—C. COMBE, Cobham Park, Surrey :—and Mrs. C. MCINTOSH, Havering Atte Bower, Havering, Essex.

**H. C.**—S. F. BERRY, Old Wellbury, Hitchin :—F. J. DOUGLAS, Catherington, Horndean, Hants :—A. GIBBS, Tyntesfield, Bristol :—Sir A. ACLAND-HODO, Bart., M.P., St. Audries, Bridgwater :—W. RIDDLE, Hope Farm, Falfield, Gloucestershire :—and Mrs. J. WALKER, Hill Farm, Northleach, Gloucestershire.

**C.**—Mrs. K. S. FARMER, Barrack Farm, Newport, Monmouthshire :—Major-Gen. H. H. LEE, The Mount, Dinas Powis, Cardiff :—F. M. NEWTON, Barton Grange, Pitminster, Taunton :—W. B. RODERICK, Fronhenlog, Llanelly :—LORD ROTHSCHILD, Tring Park, Herts :—and Miss S. SPARROW, Ellis Farm, Hardwicke, Gloucestershire.

**CLASS 140.**—3 lbs. of *Fresh (or very slightly salted) Butter, in pound plain rolls or brick shapes, made by a Student who had attended a course of instruction at any of the Society's Butter Schools.* [22 entries.]

**I. (£5).**—Miss M. J. WILLIAMS, Regilbury Park, Winford, Bristol.

**II. (£3).**—Miss F. M. COLE, Home Farm, Tring, Herts.

**III. (£2).**—Miss G. LAWRENCE, Dinder Home Dairy, Wells, Somerset.

**IV. (£1.)**—W. W. COLE, Gollege Farm, Wells, Somerset.

**R. & V. H. C.**—Mrs. A. HODGE, Chariton, Portbury.

**H. C.**—Miss M. SPILLER, Trimshayes Farm, Stockland, Honiton :—and Miss A. A. WALKER, Ockington, Dymock.

**C.**—Miss A. CRYER, Ridge Farm, Blagdon, Somerset :—Miss N. MUIRHEAD, Winsford House, Beaworthy, Devon :—and Mrs. B. READ, New Barn Farm, Chewton Keynsham, Bristol.

**CLASS 141.**†—3 lbs. of *Fresh (or very slightly salted) Butter, in pound plain rolls or brick shapes, made by a resident in Somerset who had attended a course of instruction at any of the Society's Somerset Butter Schools.* [16 entries.]

**I. (£3).**—W. W. COLE, Gollege Farm, Wells.

**I. (£3).**—Miss M. J. WILLIAMS, Regilbury Park, Winford, Bristol.

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\* Three Special Prizes of 1l. each were given for Butter exhibited which had the best keeping qualities. 1 lb. was taken on the first day of the Show from each Prize lot of Butter, and the whole of these were judged on the last day of the Show.

† The Prizes in Class 141 were given by the Somerset County Council.

- II. (£2).—Mrs. A. HODGE, Charlton, Portbury.  
 II. (£2).—Miss G. LAWRENCE, Home Dairy, Dinder, Wells, Somerset.  
 II. (£2).—Miss A. YEATES, Barrow Court Farm, Flax Bourton, Somerset.  
 H. C.—Miss A. CRYER, Ridge Farm, Blagdon, Somerset:—and R. SHUTLER, Marks Barn Farm, Crewkerne.  
 C.—Miss R. M. CHANCELLOR, Wood Barn Farm, Chew Magna:—and Miss P. WEAVER, Hounsley Farm, Winford, Bristol.

**CLASS 142.—3 lbs. of Fresh (or very slightly salted) Butter, in pound plain rolls or brick shapes, made from scalded cream. [36 entries.]**

- I. (£5), and Special (£1.)\*—LORD POLTIMORE, Poltimore Park, Exeter.  
 II. (£3).—W. RIDDLE, Hope Farm, Falfield, Gloucestershire.  
 III. (£2).—J. F. HALL, Chilcote Manor Farm, Wells, Somerset.  
 IV. (£1).—T. COLE, Gollege Farm, Wells, Somerset.  
 R. & V. H. C.—J. WILLIAMS, Regilbury Park, Winford, Bristol.  
 V. H. C.—J. CHANNON, Wishford, Broadclyst:—A. GIBBS, Tyntesfield, Bristol:—C. HAYES, Keyford House Farm, Frome, Somerset:—LORD ROTHCCHILD, Tring Park, Herts:—A. F. SOMERVILLE, Dinder, Wells, Somerset:—C. C. TUDWAY, Walcombe Dairy, Wells, Somerset:—M. J. WILLIAMS, North Hill Farm, Chew Stoke:—and C. YEATES, Barrow Court Farm, Flax Bourton.  
 H. C.—W. ASHCROFT, Layhams Farm, Hayes, Kent:—F. J. DOUGLAS, Catherington, Horndean, Hants:—and W. F. MERRY, Ashclyst, Broadclyst, Exeter.  
 C.—Sir A. ACLAND HOOD, Bart., M.P., St. Audries, Bridgwater:—W. LEVERTON, Woolleigh Barton, Beaford:—LONDON, GLOUCESTER AND NORTH HANTS DAIRY COMPANY, 12 to 20, Whatley Road, Clifton:—and Miss A. A. WALKER, Ockington, Dymock.

**CLASS 143.—3 lbs. of Butter, to which no salt whatever had been added, in pound plain rolls or brick shapes. [40 entries.]**

- I. (£5), and Special (£1.)\*—J. F. HALL, Chilcote Manor Farm, Wells, Somerset.  
 II. (£3).—Hon. A. HOLLAND-HIBBERT, Mulden, Watford, Herts.  
 III. (£2).—C. COMBE, Cobham Park, Surrey.  
 IV. (£1).—F. J. DOUGLAS, Catherington, Horndean, Hants.  
 R. & V. H. C.—J. CHANNON, Wishford, Broadclyst, Exeter.  
 I. C.—A. GIBBS, Tyntesfield, Bristol:—Mrs. C. MCINTOSH, Havering Power, Havering, Essex:—C. C. TUDWAY, Walcombe Dairy, Wells, Somerset:—Mrs. J. WALKER, Hill Farm, Northleach, Gloucestershire:—and C. YEATES, Barrow Court Farm, Flax Bourton, Somerset.  
 H. C.—W. ASHCROFT, Layhams Farm, Hayes, Kent:—F. J. DOUGLAS, Catherington, Horndean, Hants:—and W. F. MERRY, Ashclyst, Broadclyst, Exeter.  
 C.—Sir A. ACLAND HOOD, Bart., M.P., St. Audries, Bridgwater:—W. LEVERTON, Woolleigh Barton, Beaford:—LONDON, GLOUCESTER AND NORTH HANTS DAIRY COMPANY, 12 to 20, Whatley Road, Clifton:—and Miss A. A. WALKER, Ockington, Dymock.

Since 1881 the prize for the best keeping quantity of 1 lb. was taken on the first day of the Show from the Prize of 1 lb. of Butter. The whole of these were judged on the last day of the Show.



ROTHSCHILD, Tring Park, Herts:—J. WILLIAMS, Regilbury Park, Tord, Bristol:—and M. J. WILLIAMS, North Hill Farm, Chew Stoke.  
—J. BUTT, Compton Bishop, Axbridge:—W. FLEMING, Orange Court, dford:—and P. G. WELCH, Gold Hill, Chalfont St. Peter, Bucks.

SS 144.—*12 lbs. of Salted Butter, in a jar or crock, delivered to the Secretary four weeks before the Show.* [17 entries.]

- (£5).—M. J. WILLIAMS, North Hill Farm, Chew Stoke.
- L. (£3).—J. WILLIAMS, Regilbury Park, Winford, Bristol.
- II. (£2).—N. TODD, Okeford Fitzpaine, Blandford.
- V. (£1).—J. BUTT, Compton Bishop, Axbridge.
- .. & V. H. C.—C. HAYES, Keyford House Farm, Frome, Somerset.
- . H. C.—F. J. DOUGLAS, Catherington, Horndean, Hants.
- L. C.—W. LEVERTON, Woolleigh Barton, Beaford, N. Devon.
- .—Sir W. H. WILLS, Bart., M.P., Coombe Lodge, Blagdon, R.S.O.

SS 145.\*—*4 half-pounds of Clotted or Devonshire Cream, packed either in tins or earthen jars.* [11 entries.]

- (£3).—F. M. NEWTON, Barton Grange, Pitminster, Taunton.
- L. (£2).—W. BEER, Trinity Dairy, Barnstaple.
- II. (£1).—Hon. Mrs. TREFUSIS, Thorncombe, Crowcombe, Taunton.
- .. & H. C.—Miss M. L. HELLIER, Wick St. Lawrence, Weston-super-e.
- !—H. FARTHING, Thurloxton, Taunton.

## BUTTER-MAKING COMPETITIONS.

the Working Dairy in the Show-yard. Not open to Makers or Vendors of turns or their Assistants, or to any previous winner of the Society's Champion Gold Medal.)

se Prizes were awarded for the best and largest quantity of Butter made on a given quantity of Cream in the cleanest and most approved method.

SS 146.—*On the first day of the Show, open only to Students who had attended a course of instruction at any of the Society's Butter Schools.* [60 entries.]

- (£5).—Miss F. M. COLE, Home Farm, Tring, Hertfordshire.
- L. (£3).—Miss A. YEATES, Barrow Court Farm, Flax Bourton, erset.
- II. (£2).—Miss A. A. WALKER, Ockington, Dymock.
- V. (£1).—Miss I. WIDDRINGTON, The Batch, Flax Bourton.

The First Prize in Class 145 was given by the Somerset Agricultural ciation.

**V. (10s.)**—Miss M. F. NORTHAM, Fountain Dairy, 17, Angel Hill, Tiverton.

**R.**—Miss M. CLANDY, The Mount, Dinas Powis, Cardiff.

**H. C.**—Miss M. PARSONS, East Town Farm, Wick St. Lawrence:—Miss M. PERRY, Downside College Dairy, Stratton-on-Fosse, Bath:—Miss A. M. WATTS, Fairgreen, Chipping Norton:—Miss HARDWICKE, Dundry, Bristol:—Miss W. M. HEBDITCH, Castle Close, Stoke-sub-Hamdon:—Miss M. WEBB, East Brent, near Highbridge:—and Miss F. WILLY, Coles Farm, South Petherton.

**C.**—Miss E. B. COOPER, Chew Court, Chew Magna:—Miss M. K. GOODFORD, Chilton Cantelo, Ilchester, Taunton:—Mrs. A. HODGE, Charlton, Portbury:—Miss E. SHORE, Frogmore, Broadclyst:—and Miss E. STERRY, Poltimore Rectory, Exeter.

**CLASS 147.\*—On the second day of the Show, open only to residents in Somerset who had attended a course of instruction at any of the Society's Somerset Butter Schools. [35 entries.]**

**I. (£3.)**—Miss G. LAWRENCE, Home Dairy Farm, Dinder, Wells.

**I. (£3.)**—Miss M. WILLY, Cole's Farm, South Petherton.

**II. (£2.)**—Mrs. A. HODGE, Charlton, Portbury.

**II. (£2.)**—Miss W. M. HEBDITCH, Castle Close, Stoke sub-Hamdon.

**II. (£2.)**—Miss E. J. SALISBURY, Hinton Farm, Ilchester.

**R.**—Miss M. THATCHER, Burrington Farm, Burrington, near Bristol.

**H. C.**—Miss T. M. WEAVER, Hounsley Farm, Winford, Bristol:—Miss R. EVANS, Chew Hill Farm, Chew Magna:—and Miss E. LUDLOW, Block House, Nynehead, Wellington.

**C.**—Miss M. PARSONS, East Town Farm, Wick St. Lawrence:—Miss M. PERRY, Downside College Dairy, Stratton-on-Fosse, Bath:—C. I. RENOUF, 34, Kingston, Yeovil:—Miss A. YEATES, Barrow Court Farm, Flax Bourton:—Miss M. E. DAMPNEY, Hinton, Ilchester:—and Miss E. HILL, Wellow, Somerset.

**CLASS 148.†—On the second day of the Show, open to any Woman. [54 entries.]**

**I. (£5.)**—Miss A. M. WATTS, Fairgreen, Chipping Norton, Oxon.

**II. (£3.)**—Miss F. M. COLE, Home Farm, Tring, Herts.

**III. (£2.)**—Miss A. YEATES, Barrow Court Farm, Flax Bourton.

**IV. (£1.)**—Miss M. GREENAWAY, Ebbw Place, Ebbw Bridge, near Newport, Mon.

**V. (10s.)**—Miss E. FARRANT, Ashclyst, Broadclyst, Exeter.

**R. & V. H. C.**—Miss M. SPILLER, Trimshayes Farm, Stockland, Honiton.

**H. C.**—Miss M. BEECHENER, Green Farm, Barton, Ampthill:—Mrs. M. BILCLIFFE, Little Mill Reformatory, Pontypool, Mon.:—Mrs. E. R. BLACK-

\* The Prizes in Class 147 were offered by the Somerset County Council.

† The First, Second and Third Prizes in Class 148 were given by the Somerset Agricultural Association.

### *Prizes awarded for Butter-Making.*

ELL, Cowden Hall, Heathfield, Sussex :—and Miss E. SUMMERS, W  
th.

C.—Miss M. J. BRIMBLE, Greenleaze, Chew Magna :—Miss G. Co  
anor House, South Croxton, Leicester :—Miss E. G. COOK, South  
arm, Surbiton Hill, Surrey :—Miss S. J. FOWLER, Kingston Se  
atton :—Miss A. A. WALKER, Ockington, Dymock :—Miss L. W  
undry, Somerset :—Miss A. CRYER, Ridge Farm, Blagdon :—and I  
RANKPITT, Forke Farm, Crump Morchard, Taunton.

CLASS 149.—*On the third day of the Show, open to any Man or W  
except the Winner of the 1st Prize in Class 148.* [62 entrie

I. (£5.)—A. BAYNES, Broxted Hall, Dunmow, Essex.

II. (£3.)—Miss M. CLANDY, The Mount, Dinas Powis, Cardiff.

III. (£2.)—Miss E. GRANTHAM, West Keal Hall, Spilsby.

IV. (£1.)—Miss A. YEATES, Barrow Court Farm, Flax Bourton.

V. (10s.)—Miss A. A. WALKER, Ockington, Dymock.

R. & V. H. C.—Miss S. J. FOWLER, Kingston Seymour, Yatton.

H. C.—Mrs. M. BATH, Lutsey Farm, Worton :—Miss M. J. B  
reenleaze, Chew Magna :—Mrs. N. COMER, Hurts Hall Dairy, Sa  
nam :—Miss C. MORGAN, Croesllanfro, Rogerstone, near Newport :—M  
SHEPHERD, Hailstone Farm, Wrington, Somerset :—and Miss L. W  
Dundry, Somerset.

C.—Miss M. BEECHENER, Green Farm, Barton, Amptill :—M  
BILCLIFFE, Little Mill Reformatory, Pontypool, Mon. :—W. W. COLE,  
Farm, Wells :—Miss G. CONNELL, Manor House, South Croxton, Leice  
Miss E. G. COOK, South Down Farm, Surbiton Hill :—Miss A. M. W  
Hounsley Farm, Winford, Bristol :—Miss A. CRYER, Ridge Farm, Bl  
and Miss I. WIDDRINGTON, The Batch, Flax Bourton.

CLASS 150.—*On the fourth day of the Show, open to any  
Woman, except the Winners of the 1st Prizes in Classes 148 and  
[60 entries.]*

I. (£5.)—Miss H. BAYNES, Broxted Hall, Dunmow, Essex.

II. (£3.)—Miss S. S. SPARROW, Ellis Farm, Hardwicke, near Glouc

III. (£2.)—Miss N. PARKER, Hill Farm, Trostre, near Usk, Mon

IV. (£1.)—Miss G. CONNELL, Manor House, South Croxton, Leice

V. (10s.)—Miss M. GREENAWAY, Ebbw Place, Ebbw Bridge  
Newport, Monmouth.

R. & V. H. C.—Miss A. A. WALKER, Ockington, Dymock.

H. C.—Miss F. M COLE, Home Farm, Tring, Hertfordshire :—Miss  
COOK, South Down Farm, Surbiton Hill :—Miss E. M. PARKER, Hill  
Trostrey, near Usk, Monmouth :—Miss N. THATCHER, Burrington  
Burrington, Bristol :—Miss A. YEATES, Barrow Court Farm, Flax Bou  
Miss M. PERRY, Stratton-on-Avon, Bath :—and Miss M. SPILLER, Trin  
Farm, Stockland, Honiton.

C.—Mrs. M. BATH, Lutsey Farm, Worton, Devizes :—Miss E. B  
Green Farm, Barton, Amptill :—Mrs. M. BILCLIFFE, Little Mill  
tory, Pontypool, Mon. :—Miss M. CLANDY, The Mount, Dinas

Cardiff:—W. W. COLE, Gollege Farm, Wells:—Mrs. N. COMER, Hurts Hall Dairy, Saxmundham:—Mrs. A. HODGE, Charlton, Portbury:—Mrs. G. MOGFORD, Chilcote Manor Farm, Wells:—Miss M. CARSON, Beaconsfield, Hewlett Road, Cheltenham:—Miss A. CRYER, Ridge Farm, Blagdon:—Miss A. FRANKPITT, Forke Farm, Crump Morchard, Taunton:—Miss M. PARSONS, Wick St. Lawrence:—and Miss S. HOLMES, Hardy's Farm, Colaton Raleigh, Ottery St. Mary.

**CLASS 151.**—*On the fifth day of the Show, open to any Dairymaid working for wages not exceeding £20 a-year.* [12 entries.]

**I. (£3.)**—Mrs. N. COMER, Hurts Hall Dairy, Saxmundham.

**II. (£2.)**—Miss A. A. WALKER, Ockington, Dymock.

**III. (£1.)**—Miss M. PARSONS, Wick St. Lawrence.

**IV. (10s.)**—Miss L. WALKER, Dundry, Somerset.

**R.**—Miss G. LAWRENCE, Home Dairy Farm, Dinder, Wells.

**H. C.**—Mrs. G. MOGFORD, Chilcote Manor Farm, Wells:—and Miss M. WEBB, East Brent, Highbridge, Somerset.

**C.**—Miss L. MILLS, Holnicote, Taunton:—Miss A. YEATES, Barrow Court Farm, Flax Bourton:—Miss R. BATSTONE, Oxenleaze, Kilmington, Axminster:—Miss R. EVANS, Chew Hill Farm, Chew Magna:—and Miss A. FRANKPITT, Forke Farm, Crump Morchard, Taunton.

### CHAMPION PRIZES.\*

*On the fifth day of the Show the Winners of Prizes in Classes 146, 147, 148, 149, 150, and 151 competed for:—*

**I. (A Gold Medal, the Society's Certificate, and £5.)**—Miss A. A. WALKER, Ockington, Dymock.

**II. (A Silver Medal, the Society's Certificate, and £3.)**—Mrs. N. COMER, Hurts Hall Dairy, Saxmundham.

**III. (A Bronze Medal, the Society's Certificate, and £2.)**—Miss H. BAYNES, Broxted Hall, Dunmow, Essex.

**R.**—Miss G. CONNELL, Manor House, South Croxton, Leicester.

### MILKING COMPETITION.

**CLASS 152.**—*For Men.* [12 entries.]

**I. (£1 10s.) & R. & V. H. C. for Champion.**†—W. HARDWICKE, Dundry Bristol.

**II. (£1) and Champion (£2.)**†—C. POOLE, The Barton, Galmington, near Taunton.

**III. (15s.)**—W. COWARD, Chewton Keynsham.

\* The money-prizes in the Champion Class were given by the Taunton Local Committee.

† For the Best Competitor in Class 152, 153, or 154.

**IV. (10s.)**—T. C. CANDY, Woolcombe, Cattistock, Dorset.

**R. & H. C.**—J. STONE, Bodden, Shepton Mallet.

**H. C.**—T. KEEPIN, Totterdown, Weston-Super-Mare :—J. POLLEY, Woolcombe, Cattistock, Dorset :—and H. REED, Pool Farm, Taunton.

**CLASS 153.—For Women.** [4 entries.]

**I. (£1 10s.)**—Mrs. N. COMER, Hurts Hall Dairy, Saxmundham.

**II. (£1.)**—Miss S. J. FOWLER, Kingston Seymour, Yatton, Somerset.

**III. (15s.)**—BESSIE BURROWS, Stoke St. Mary, Taunton.

**CLASS 154.—For Boys.** [1 entry.]

**I. (£1.)**—HERBERT HALI, Sutton Mallet.

**DAIRY APPLIANCE.**

**CLASS 155.—A Gold Medal was offered for the best Acidimeter.**

[No exhibit.]

The following were to be regarded as essential points in deciding upon the merits of the exhibits in Class 155 :—Efficiency, simplicity of construction, adaptability to the testing of milk and different milk products, and economy in cost.

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**HORSE-SHOEING COMPETITION.**

A pair of Shoeing Models, and a copy of Miles's 'Treatise on Shoeing,' were presented to each winner of a Prize in Class 156 or 157.

The Registration Committee of the Farriers' Company admitted the Winners of First Prizes in these Competitions to the Official Register *free of charge*, on their satisfying the Judges that they had a fair knowledge of the structure of the horse's foot, and on the necessary application being made to the Company in the prescribed form.

**CLASS 156.—Best Shoeing of a Nag Horse by a Smith on the third day of the Show.** [57 entries.]

**I. (£5.)**—W. HILL, R.S.S., The Square, Chagford, Devon.

**II. (£3.)**—W. RUDGE, Brampton, Madley, Hereford.

**III. (£2.)**—J. MAY, R.S.S., Park Street, Guildford.

**IV. (£1.)**—R. LEWIS, R.S.S., 3, Circus Mews, Bath.

**V. H. C.**—S. W. GALLOP, Chew Magna :—F. MAY, R.S.S., Send, Woking, Surrey :—J. RUDGE, Brampton, Madley, Hereford :—and G. YEATES, Barrow Burney, Bristol.

**C. and Extra (£1 1s.)\***—T. KERR, Charlwood Villas, Ruscombe, Twyford, Berks.

**C.**—S. EVANS, Pontestyll, near Brecon :—J. HARRIES, Rhyddodin, Llanunnon, Carmarthen :—and T. POWIS, Nelson, Treharris, R.S.O.

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\* Given by the Worshipful Company of Farriers, for the Best Competitors in Classes 156 and 157 who had never won a Prize at any Agricultural Society's shoeing Competitions.

**CLASS 157.—*Best Shoeing of a Cart Horse on the fourth day of the Show.* [56 entries.]**

- I. (£5.)**—J. MAY, R.S.S., Park Street, Guildford.
- II. (£3.)**—S. W. GALLOP, Chew Magna.
- III. (£2.)**—W. RUDGE, Brampton, Madley, Hereford.
- IV. Equal (£1.)**—R. LEWIS, R.S.S., 3, Circus Mews, Bath.
- IV. Equal (£1.)**—F. May, R.S.S., Send, Woking, Surrey.
- V. H. C., and Extra (£1 1s.)\***—J. RIDGE, Fore Street, North Petherton, Bridgwater.
- V. H. C.**—W. DENNER, sen., Cockpit Hill, Cullompton.
- H. C.**—H. KERSLAKE, Sampford Brett, Taunton :—and F. WEAVER, R.S.S., Paul Street Shoeing Forge, Taunton.
- C.**—S. EVANS, Pontystyll, near Brecon :—H. C. FRANCIS, 14, Dowlais Street, Aberdare :—and E. OWEN, 29, Glebeland Street, Merthyr Tydvil.

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**SHEEP-SHEARING.**

**CLASS 158.—*Best Shearing of Two Sheep on the fifth day of the Show by Competitors under twenty years of age.* [6 entries.]**

- I. (£4.)**—J. HOLLAND, Long Sutton.
- II. (£3.)**—H. J. CHANCELLER, Wood Barn Farm, Chew Magna.
- III. (£2.)**—E. DAVID, Long Sutton, near Langport.
- IV. (£1.)**—ALBION DAVID, Long Sutton, near Langport.

**CLASS 159.—*Best Shearing of Two Sheep on the fifth day of the Show by Competitors twenty years of age and over.* [32 entries.]**

- I. (£4.)**—J. HAYMAN, East Street, Cannington, near Bridgwater.
- II. (£3.)**—M. David, Long Sutton, near Langport.
- III. (£2.)**—ARTHUR DAVID, Long Sutton, near Langport.
- IV. (£1.)**—F. T. BURT, Long Sutton, near Langport.
- Extra (10s.)**—R. FARMER, Withycombe.
- TRIDGE**, Long Sutton, near Langport.
- DODINGTON**, Dodington, Bridgwater.

*Class generally commended.)*

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\* The only Sheep on Paul Company of Farriers for the Best Competitors in 1896 and 1897 who had never won a Prize at any Agricultural Society's Shoeing Competition.

## POULTRY.

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CLASS 1.—COCHINS (CINNAMON and BUFF), COCK. [3 entries.]

I. (£1 10s.)—Mrs. S. R. HARRIS, *buff*.

II. (15s.)—Mrs. S. R. HARRIS.

R. & H. C.—Mrs. RADCLYFFE, *buff*.

CLASS 2.—COCHINS (CINNAMON and BUFF), HEN. [3 entries.]

I. (£1 10s.)—Mrs. S. R. HARRIS, *buff*.

II. (15s.)—Mrs. S. R. HARRIS.

H. C.—Mrs. RADCLYFFE, *buff*.

CLASS 3.—COCHINS (PARTRIDGE-FEATHERED OR WHITE), COCK. [5 entries.]

I. (£1 10s.)—Mrs. S. R. HARRIS, *partridge*.

II. (15s.)—Mrs. S. R. HARRIS.

V. H. C.—J. C. SHUFFREY, *partridge*.

H. C.—J. A. SLATTER, *partridge*.

CLASS 4.—COCHINS (PARTRIDGE-FEATHERED OR WHITE), HEN. [4 entries.]

I. (£1 10s.)—J. C. SHUFFREY.

II. (15s.)—Mrs. S. R. HARRIS, *partridge*.

CLASS 5.—BRAHMAS (DARK), COCK. [3 entries.]

I. (£1 10s.)—S. W. THOMAS.

II. (15s.)—W. MOORE.

H. C.—P. L. BENSON.

CLASS 6.—BRAHMAS (DARK) HEN. [2 entries.]

I. (£1 10s.)—S. W. THOMAS.

H. C.—W. MOORE.

CLASS 7.—BRAHMAS (LIGHT), COCK. [4 entries.]

I. (£1 10s.)—W. F. POTTER.

II. (15s.)—H. E. BUSH.

H. C.—E. SCAMMELL.

CLASS 8.—BRAHMAS (LIGHT), HEN. [3 entries.]

I. (£1 10s.)—J. H. NICHOLLS.

II. (15s.)—W. F. POTTER.

H. C.—H. E. BUSH.

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*Prizes awarded for Poultry.*

## CLASS 9.—LANGSHANS, COCK. [7 entries.]

- I. (£1 10s.)—P. MARSH.  
 II. (15s.)—W. RAWLINGS.  
 III. (5s.)—J. KEOUGH.  
 H. C.—A. S. HISCOCK :—and C. SEABROOKE.

## CLASS 10.—LANGSHANS, HEN. [6 entries.]

- I. (£1 10s.)—P. MARSH.  
 II. (15s.)—S. BROWNE.  
 III. (5s.)—J. THOMAS.  
 V. H. C.—J. W. WALKER.  
 H. C.—A. S. HISCOCK.

## CLASS 11.—PLYMOUTH ROCKS, COCK. [7 entries.]

- I. (£1 10s.)—A. and S. DONKIN.  
 II. (15s.)—S. W. THOMAS.  
 III. (5s.)—A. S. HISCOCK.  
 V. H. C.—W. E. DANTON.  
 H. C.—J. V. BARNETT.

## CLASS 12.—PLYMOUTH ROCKS, HEN. [8 entries.]

- I. (£1 10s.)—JAMES FRAYNE.  
 II. (15s.)—A. THOMAS.  
 III. (5s.)—W. E. DANTON.  
 V. H. C.—A. POLY-DIDIER.  
 H. C.—J. V. BARNETT.

## CLASS 13.—WYANDOTTES, COCK. [5 entries.]

- I. (£1 10s.)—C. SEABROOKE.  
 II. (15s.)—H. BOADEN.  
 III. (5s.)—W. H. FOWLER.

## CLASS 14.—WYANDOTTES, HEN. [4 entries.]

## CLASS 15.—LANGSHANS, COCK. [9 entries.]



*Prizes awarded for Poultry.*

li

(5s.)—W. COOK and SON.

L. C.—W. MCK. BRADLEY :—and E. STOUT.

2.—W. COOK and SON :—and HUNTLEY and PICKARD.

CLASS 16.—ORPINGTONS, HEN. [7 entries.]

£1 10s.)—W. COOK and SON.

(15s.)—HUNTLEY and PICKARD.

(5s.)—W. COOK and SON.

2.—W. MCK. BRADLEY.

CLASS 17.—SPANISH, COCK. [3 entries.]

£1 10s.)—L. HAKE.

(15s.)—Miss A. P. SEDMAN.

L. C.—F. HARVEY.

CLASS 18.—SPANISH, HEN. [8 entries.]

£1 10s.)—L. HAKE.

(15s.)—L. HAKE.

(5s.)—G. MONK.

L. C.—J. HUNT.

C.—F. HARVEY :—J. HUNT :—and R. P. Wheadon.

CLASS 19.—MINORCAS, COCK. [12 entries.]

£1 10s.)—FURSLAND BROS.

(15s.)—J. McD. BEATTIE.

(5s.)—G. BUCKLAND.

L. C.—W. T. DOMINY :—S. NASH :—and A. LEWIS.

2.—E. T. DEW :—A. G. PITTS :—and A. G. PITTS.

CLASS 20.—MINORCAS, HEN. [16 entries.]

£1 10s.)—A. LEWIS.

(15s.)—A. G. PITTS.

(5s.)—W. PETER.

(Extra 5s.)—A. G. PITTS.

L. C.—E. T. DEW :—FURSLAND BROS. :—and S. NASH.

2.—G. BUCKLAND :—W. C. HANCOCK :—and R. YEO.

CLASS 21.—LEGHORNS (ANY VARIETY), COCK. [6 entries.]

£1 10s.)—WADE BROS., *white*.

(15s.)—W. B. PAULIN, *brown*.

(5s.)—G. F. HIGGINSON, *brown*.

L. C.—STANBURY BROS.

2.—Mrs. LISTER-KAY.

CLASS 22.—LEGHORNS (ANY VARIETY), HEN. [10 entries.]

I. (£1 10s.)—STANBURY BROS.

II. (15s.)—WADE BROS., *white*.

III. (5s.)—G. DAVIS, *white*.

V. H. C.—P. PERCIVAL, *white*.

H. C.—W. C. CHAPPEL, *white*:—Mrs. LISTER KAY:—and Mrs. SINKINS.

CLASS 23.—HAMBURG (GOLD OR SILVER SPANGLED), COCK. [4 entries.]

I. (£1 10s.)—H. PICKLES.

II. (15s.)—W. SMITH.

H. C.—Rev. S. ASHWELL, *silver*.

CLASS 24.—HAMBURG (GOLD OR SILVER SPANGLED), HEN. [3 entries.]

II. (15s.)—W. SMITH.

III. (5s.)—H. PICKLES.

CLASS 25.—HAMBURG (GOLD OR SILVER PENCILLED), COCK. [4 entries.]

II. (15s.)—H. PICKLES.

III. (5s.)—W. SNELL.

CLASS 26.—HAMBURG (GOLD OR SILVER PENCILLED), HEN. [8 entries.]

I. (£1 10s.)—Mrs. J. NICHOLLS.

II. (15s.)—J. HOLLINGBRAKE.

III. (5s.)—H. PICKLES.

H. C.—W. H. HAWKINGS:—W. SNELL:—and W. SNELL.

CLASS 27.—HAMBURG (BLACK), COCK. [4 entries.]

I. (£1 10s.)—H. W. HANGER.

II. (15s.)—R. W. WHITTAKER.

H. C.—H. PICKLES.

CLASS 28.—HAMBURG (BLACK), HEN. [6 entries.]

I. (£1 10s.)—H. PICKLES.

II. (15s.)—H. W. HANGER.

III. (5s.)—R. W. WHITTAKER.

H. C.—H. PICKLES.

CLASS 29.—HAMBURG (BLACK), COCK. [6 entries.]

I. (£1 10s.)—H. W. HANGER.

II. (15s.)—R. W. WHITTAKER.

III. (5s.)—H. PICKLES.

H. C.—H. PICKLES.

H. C.—H. PICKLES.

*Prizes awarded for Poultry.*

1

CLASS 30.—DORKINGS (COLOURED), HEN. [10 entries.]

- I. (£1 10s.)—W. S. PINSENT.
- II. (15s.)—FORD and SLATER.
- III. (5s.)—C. LUCKIN.
- C.—W. S. PINSENT :—A. THOMAS :—and W. G. WATSON.

CLASS 31.—DORKINGS (SILVER GREY), COCK. [2 entries.]

- I. (£1 10s.)—O. E. CRESSWELL.
- V. H. C.—Mrs. M. SPERLING.

CLASS 32.—DORKINGS (SILVER GREY), HEN. [3 entries.]

- I. (£1 10s.)—O. E. CRESSWELL.
- II. (15s.)—O. E. CRESSWELL.
- H. C.—Mrs. RADCLYFFE.

CLASS 33.—DORKINGS (WHITE OR CUCKOO), COCK. [4 entries.]

- I. (£1 10s.)—O. E. CRESSWELL, *white*.
- II. (15s.)—O. E. CRESSWELL, *white*.
- H. C.—J. J. G. WOODCOCK, *white*.
- C.—W. H. COPPLESTONE, *cuckoo*.

CLASS 34.—DORKINGS (WHITE OR CUCKOO), HEN. [5 entries.]

- I. (£1 10s.)—O. E. CRESSWELL, *white*.
- II. (15s.)—J. J. G. WOODCOCK, *white*.
- III. (5s.)—W. H. COPPLESTONE, *cuckoo*.
- H. C.—O. E. CRESSWELL, *white*.
- C.—A. S. HISCOCK, *white*.

CLASS 35.—GAME (BLACK-BREASTED REDS), COCK. [4 entries.]

- I. (£1 10s.)—C. W. BRIERLEY.
- II. (15s.)—J. LANGLANDS.
- H. C.—C. F. W. JACKSON.

CLASS 36.—GAME (BLACK-BREASTED REDS), HEN. [5 entries.]

- I. (£1 10s.)—C. W. BRIERLEY.
- II. (15s.)—J. COOMS.
- H. C.—HARRIS BROS.

CLASS 37.—GAME (BROWN-BREASTED REDS), COCK. [3 entries.]

- I. (£1 10s.)—C. W. BRIERLEY.
- II. (15s.)—A. LUCKIN.
- H. C.—J. C. HUXTABLE.

CLASS 38.—GAME (BROWN-BREADED REDS), HEN. [5 entries.]

I. (£1 10s.)—C. W. BRIERLEY.

II. (15s.)—J. C. HUXTABLE..

H. C.—L. HAKE.

CLASS 39.—GAME (PILE OR ANY OTHER VARIETY), COCK. [5 entries.]

I. (£1 10s.)—C. W. BRIERLEY.

II. (15s.)—J. C. HUXTABLE, *pile*.

H. C.—J. COOMS, *pile* :—and HARRIS BROS., *pile*.

CLASS 40.—GAME (PILE, OR ANY OTHER VARIETY), HEN. [6 entries.]

I. (£1 10s.)—A. S. HISCOCK, *pile*.

II. (15s.)—C. W. BRIERLEY, *pile*.

H. C.—HARRIS BROS., *pile*.

CLASS 41.—GAME (OLD ENGLISH), COCK. [7 entries.]

I. (£1 10s.)—W. NIXON.

II. (15s.)—G. ROPER.

III. (5s.)—J. D. T. PARSONS.

H. C.—G. ROPER.

CLASS 42.—GAME (OLD ENGLISH), HEN. [5 entries.]

I. (£1 10s.)—W. NIXON.

II. (15s.)—J. D. T. PARSONS.

H. C.—J. T. ORGAN :—and J. W. SIMPSON.

CLASS 43.—INDIAN GAME, COCK. [5 entries.]

I. (£1 10s.)—JOHN FRAYN.

II. (15s.)—W. BRENT.

V. H. C.—JAMES FRAYNE :—and P. PERCEVAL.

CLASS 44.—INDIAN GAME, HEN. [3 entries.]

I. (£1 10s.)—JAMES FRAYNE.

II. (15s.)—W. BRENT.

H. C.—W. E. and E. J. MARSHALL.

CLASS 45.—MALAYS, COCK. [5 entries.]

I. (£1 10s.)—J. C. HUXTABLE.

II. (15s.)—JOHN FRAYN.

V. H. C.—E. A. PARISH.

H. C.—J. C. HUXTABLE :—and J. H. NICHOLLA.

CLASS 46.—MALAYS, HEN. [4 entries.]

- I. (£1 10s.)—J. C. HUXTABLE.
- II. (15s.)—JOHN FRAYN.
- H. C.—Miss S. A. HUXTABLE :—and J. C. HUXTABLE.

CLASS 47.—FRENCH FOWL (HOUDAN, CRÈVE, LA FLÈCHE, OR ANY OTHER BREED), COCK. [5 entries.]

- I. (£1 10s.)—S. W. THOMAS.
- II. (15s.)—J. HILL, *Houdan*.
- H. C.—F. GABITAS and Co., *Houdan*.

CLASS 48.—FRENCH FOWL (HOUDAN, CRÈVE, LA FLÈCHE, OR ANY OTHER BREED), HEN. [4 entries.]

- I. (£1 10s.)—S. W. THOMAS.
- II. (15s.)—S. W. THOMAS.
- H. C.—F. GABITAS and Co., *Houdan*.

CLASS 49.—ANY OTHER DISTINCT VARIETY (NOT PREVIOUSLY MENTIONED), COCK. [3 entries.]

- I. (£1 10s.)—W. F. PORTER, *Andalusian*.
- II. (15s.)—W. F. PORTER, *Andalusian*.
- H. C.—J. E. ALLEN, *black Coch*in.

CLASS 50.—ANY OTHER DISTINCT VARIETY (NOT PREVIOUSLY MENTIONED), HEN. [2 entries.]

- I. (£1 10s.)—W. F. PORTER, *Andalusian*.

**CHICKENS OF 1895.**

CLASS 51.—COCHIN, BRAHMA, LANGSHAN, PLYMOUTH ROCK, WYANDOTTE, OR ORPINGTON, COCKEREL. [8 entries.]

- I. (£1 10s.)—J. A. SLATTER, *Partridge Coch*in.
- II. (15s.)—J. B. TURNER, *buff Coch*in, 4 m., 3 w.
- III. (5s.)—W. HULL, 4 m., 3 w.
- C.—J. H. NICHOLLS, *white Coch*in, Jan. 4th.

CLASS 52.—COCHIN, BRAHMA, LANGSHAN, PLYMOUTH ROCK, WYANDOTTE, OR ORPINGTON, PULLET. [8 entries.]

- I. (£1 10s.)—H. BOADEN, *Wyandotte*, Jan. 2nd.
- II. (15s.)—J. H. NICHOLLS, *white Coch*in, Jan. 4th.
- III. (5s.)—R. R. WHITFIELD, *Orpington*.
- H. C.—P. L. BENSON, *dark Brahma*, 4 m., 26 d. :—W. HULL, 4 m., 3 w. :—A. POLY-DIDIER, *Plymouth Rock*, 14 w. :—and Mrs. R. RODWELL, *Plymouth Rock*, 16 w.

**CLASS 53.—SPANISH, MINORCA, LEGHORN, HAMBURG, OR FRENCH FOWL, COCKEREL. [8 entries.]****I. (£1 10s.)**—WADE BROS., *white Leghorn*, Jan.**II. (15s.)**—W. T. DOMINY, *Minorca*, 20 w.**III. (5s.)**—J. HILL, *Houdan*, 4 m.**H. C.**—H. HILL, *Minorca*, Jan. 14th :—Mrs. LISTER KAY, *Leghorn* :—Mrs. SINKINS, *white Leghorn*, 4½ m. :—and J. SMITH, *Spanish*, Jan. 15th.**C.**—L. and T. FAWKES, *Minorca*, 5 m.**CLASS 54.—SPANISH, MINORCA, LEGHORN, HAMBURG, OR FRENCH FOWL, PULLET. [10 entries.]****I. (£1 10s.)**—WADE BROS., *white Leghorn*, Jan.**II. (15s.)**—J. SMITH, *Spanish*.**III. (5s.)**—J. HILL, *Houdan*.**V. H. C.**—L. and T. FAWKES, *Minorca*, 5 m.**H. C.**—Mrs. LISTER KAY, *Leghorn* :—and T. WOOD, *black Minorca*, 17 w.**CLASS 55.—DORKING, GAME, MALAY, OR ANY OTHER VARIETY, COCKEREL. [7 entries.]****I. (£1 10s.)**—R. CHEESMAN, *Dorking*, 5 m.**II. (15s.)**—J. and W. BIRCH, *Indian Game*.**III. (5s.)**—JOHN FRAYN, *Malay*.**C.**—FORD and SLATER, *coloured Dorking*, 19 w.**CLASS 56.—DORKING, GAME, MALAY, OR ANY OTHER VARIETY, PULLET. [6 entries.]****I. (£1 10s.)**—JOHN FRAYN, *Indian Game*.**II. (15s.)**—R. CHEESMAN, *Dorking*, 5 m.**III. (5s.)**—Miss V. M. JEANES, *Indian Game*, 20 w., 4 d.**C.**—REBENT *Indian Game*.**CHICKENS FOR TABLE.****CLASS 57.—SPANISH, MINORCA, LEGHORN, HAMBURG, OR FRENCH COCKERELS. [2 entries.]****I. (£1 10s.)**—WADE BROS., *white Leghorn*, Jan.**CLASS 58.—SPANISH, MINORCA, LEGHORN, HAMBURG, OR FRENCH TWO PULLETS. [5 entries.]****I. (£1 10s.)**—WADE BROS., *white Leghorn*, Jan.**II. (15s.)**—J. SMITH, *Spanish*, Jan.**III. (5s.)**—J. HILL, *Houdan*, 4 m.

CLASS 59.—CROSS BREEDS (DORKING AND INDIAN OR OLD ENGLISH GAME), TWO COCKERELS. [1 entry.]

I. (£1 10s.)—W. H. FOWLER, *Dorking-Indian Game*, Nov. 4th, 1894.

CLASS 60.—CROSS BREEDS (DORKING AND INDIAN OR OLD ENGLISH GAME), TWO PULLETS. [3 entries.]

I. (£1 10s.)—E. H. OSMAN, *Indian Game-Dorking*, 4½ m.

II. (15s.)—W. H. FOWLER, *Dorking-Indian Game*, Nov. 4th, 1894.

CLASS 61.—ANY OTHER DISTINCT CROSS (BREEDS TO BE NAMED), TWO COCKERELS. [2 entries.]

I. (£1 10s.)—W. H. FOWLER, *Indian Game-Orpington*, Nov. 4th, 1894.

CLASS 62.—ANY OTHER DISTINCT CROSS (BREEDS TO BE NAMED), TWO PULLETS. [2 entries.]

I. (£1 10s.)—W. R. CROFTON, *Dorking-Redcap*, 3½ m.

#### SELLING CLASSES.

CLASS 63.—ANY DISTINCT BREED, COCK (PRICE NOT TO EXCEED £1 1s.). [15 entries.]

I. (£1 10s.)—Miss M. VERSCHOYLE, *Minorca*.

II. (15s.)—P. PERCEVAL, *Indian Game*.

III. (5s.)—J. HUNT, *Spanish*.

CLASS 64.—ANY DISTINCT BREED, HEN (PRICE NOT TO EXCEED £1 1s.). [14 entries.]

I. (£1 10s.)—P. PERCEVAL.

II. (15s.)—S. NASH, *Minorca*.

III. (5s.)—ASHLEY and CLEAVES.

H. C.—J. COOMS:—J. HUNT, *Spanish*:—and A. H. WATTS, *Spanish*.

C.—W. E. DANTON, *Plymouth Rock*.

#### BANTAMS.

CLASS 65.—BANTAMS (BLACK OR WHITE), COCK. [4 entries.]

I. (£1.)—G. PODGER, *black*.

II. (10s.)—O. E. CRESSWELL, *black*.

H. C.—J. E. PEPPERALL, *black*.

CLASS 66.—BANTAMS (BLACK OR WHITE), HEN. [6 entries.]

I. (£1.)—H. INMAN, *black*.

II. (10s.)—G. PODGER.

III. (5s.)—W. BIRCHALL, *black*.

CLASS 67.—BANTAMS (GAME, ANY VARIETY), COCK. [6 entries.]

I. (£1.)—J. WEAVER.

II. (10s.)—LADY ALINGTON.

III. (5s.)—J. COOMS.

H. C.—W. J. BOBBETT, *pile*:—and Miss S. A. HUXTABLE.

CLASS 68.—BANTAMS (GAME, ANY VARIETY), HEN. [5 entries.]

I. (£1.)—J. COOMS.

II. (10s.)—LADY ALINGTON.

H. C.—Miss S. A. HUXTABLE.

CLASS 69.—BANTAMS (ANY OTHER DISTINCT VARIETY), COCK. [5 entries.]

I. (£1.)—J. COOMS.

II. (10s.)—O. E. CRESSWELL, *Japanese*.

V. H. C.—LADY ALINGTON.

H. C.—O. E. CRESSWELL, *Japanese*:—and Miss E. KINGLAKE, *buff Cochin*.

CLASS 70.—BANTAMS (ANY OTHER DISTINCT VARIETY), HEN. [4 entries.]

I. (£1.)—J. COOMS.

II. (10s.)—O. E. CRESSWELL, *Japanese*.

H. C.—LADY ALINGTON.

### DUCKS, GEESE, AND TURKEYS.

CLASS 71.—DRAKE OR DUCK (AYLESBURY). [4 entries.]

I. (£1 10s.)—S. BROWN.

II. (15s.)—WITHERS and BERRIDGE.

CLASS 72.—DRAKE OR DUCK (ROUEN). [6 entries.]

I (£1 10s.)—S. BROWNE.

II. (£15s.)—HUNTLEY and PICKARD.

III. (5s.)—HUNTLEY and PICKARD.

CLASS 73.—DRAKE OR DUCK (PEKIN). [6 entries.]

I. (£1 10s.)—T. ALLEN.

II. (15s.)—WITHERS and BERRIDGE.

III. (5s.)—WITHERS and BERRIDGE.

CLASS 74.—COUPLE OF DUCKLINGS (FOR TABLE).

[No ENTRY.]



*Prizes awarded for Poultry.*

CLASS 75.—GANDER OR GOOSE. [2 entries.]

I. (£1 10s.)—W. E. DAINTON, *Toulouse*.

H. C.—J. WHITE, *Toulouse*.

CLASS 76.—TURKEYS, COCK. [2 entries.]

I. (£1 10s.)—W. F. SNELL, *bronze*.

H. C.—MRS. RADCLYFFE.

CLASS 77.—TURKEYS, HEN.

[No ENTRY.]

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THE AND WEST AND SOUTHERN COUNTIES SOCIETY.  
ART UNION HELD AT TAUNTON, JUNE 1, 1895.

| Value of Prize. | Prize Winner.                   | Winner's Address.                        | Name of Picture.                            | Artist.                | Price of Picture. |
|-----------------|---------------------------------|--|---|------------------------|-------------------|
| £ s. d.         |                                 |  |   |                        | £ s. d.           |
| 20 0            | E. Corner ..                    | Wellington, Somerset ..                  | 'October Brewed' ..                         | H. S. Tozer ..         | 4 10 0            |
|                 |                                 |  | 'Threshing Out' ..                          | G. C. Haite ..         | 7 7 0             |
|                 |                                 |  | 'Grandfather's Story' ..                    | R. W. Wright ..        | 4 4 0             |
|                 |                                 |  | 'Anticipation' ..                           | R. W. Wright ..        | 4 4 0             |
| 15 0            | H. Armstrong ..                 | Cleveland Street, Taunton ..             | 'A Lane at Winterbourne' ..                 | W. V. Tippet ..        | 10 0 0            |
|                 |                                 |  | 'On the Trent' ..                           | H. J. Bool ..          | 4 4 0             |
|                 |                                 |  | 'Autumn Sunshine' ..                        | Miss E. Jex Blake ..   | 3 3 0             |
| 12 0            | { E. W. Bovett,<br>M.R.C.V.S. } | Bridgwater .. .. .                       | 'A Street in Florence' ..                   | D. Buscarielli ..      | 4 4 0             |
|                 |                                 |  | 'A Street in Naples' ..                     | D. Buscarielli ..      | 4 4 0             |
| 10 10           | Mrs. Browne ..                  | 142, Fore Street, Exeter ..              | 'On the Borders of Hampshire and Surrey' .. | J. E. Grace ..         | 10 10 0           |
| 10 0            | E. Corner ..                    | Wellington, Somerset ..                  | 'The Land of Windmills' ..                  | W. Ball ..             | 5 5 0             |
|                 |                                 |  | 'The Ferry, Dordrecht, Holland' ..          | W. Ball ..             | 5 5 0             |
| 723             | J. Chapman ..                   | { Rosemont, Ashley Down,<br>Bristol }    | 'A Storm Beaten Coast' ..                   | W. J. Gibbons ..       | 2 2 0             |
| 769             | J. Bennett ..                   | 9, Downfield Road, Clifton ..            | 'Near Heavitree, Devon' ..                  | H. S. Jackson ..       | 5 5 0             |
| 84              | W. T. Cornish ..                | Abbey Churchyard, Bath ..                | 'Stormy Weather, Essex Coast' ..            | G. Stainton ..         | 5 5 0             |
| 1,200           | J. Lyons ..                     | 3, George Street, Exeter ..              | 'A Surrey Common' ..                        | Mrs. F. Berkeley ..    | 5 5 0             |
| 350             | W. Dix ..                       | 23, High Street, Newport, Mon.           | 'On the Orwell' ..                          | G. Stainton ..         | 5 5 0             |
|                 |                                 |  | 'On the Wye, near Builth' ..                | W. E. Harris ..        | 6 6 0             |
| 421             | G. Gare ..                      | { Grahams, Wembdon, Bridgwater .. .. . } | 'On the Turret, Crief, N.B.' ..             | Miss C. L. Davis ..    | 1 11 6            |
|                 |                                 |  | 'Comrie, Perthshire' ..                     | Miss C. L. Davis ..    | 1 11 6            |
|                 |                                 |  | 'Tulips' ..                                 | Miss L. Baker ..       | 1 1 0             |
|                 |                                 |  | 'Daffodils' ..                              | Miss L. Baker ..       | 1 1 0             |
| 1,183           | — Ogle ..                       | 1, Prospect Place, Bath ..               | 'A Storm Brewing, Holland' ..               | W. Ball ..             | 5 5 0             |
| 400             |                                 |  | 'Near Lymington' ..                         | Mrs. R. de Crosigny .. | 2 2 0             |
|                 |                                 |  | 'Grand Canal, Venice' ..                    | L. Flemming ..         | 1 11 6            |
|                 |                                 |  | 'Sunrise, Venice' ..                        | L. Flemming ..         | 1 11 6            |

|   |      |  |   |  |   |   |  |
|---|------|--|---|--|---|---|--|
| 1,265   | 4 10 | { R. Neville Grenville ..<br>Rev. J. M. O'Neill .. | Butleigh, Glastonbury ..<br>Wembdon, Bridgwater ..                          | { 'Sly', .. ..<br>'View on the River Exe,' ..<br>'Topsham' .. ..<br>'R.M.S. Arcadia' .. ..<br>'A Woodland Stream' .. ..<br>'A Showery Evening at Thurlestone, S. Devon' ..<br>'Off Greenhithe' .. ..<br>'A Surrey Moor' .. ..<br>'Outside Walls of Pistoye, Italy' .. ..<br>'Sunrise, Venice' .. ..<br>'Flood on North Teign, Dartmoor' .. ..<br>'Flowers that come in the Spring' .. ..<br>'Maldon, Essex' .. ..<br>'Daffodils' .. ..<br>'On the Thames' .. ..<br>'My Little Lady' .. ..<br>'By the Avon' .. ..<br>'Near Cookham-on-Thames' .. ..<br>'View at Countess Weir, near Exeter' .. .. | Miss F. Norman ..<br>A. J. Couche ..<br>L. Neville ..<br>R. Smith ..<br>Miss B. Boyns ..<br>Miss S. C. Dakin ..<br>J. E. Grace ..<br>Miss F. Bernard ..<br>L. Fleming ..<br>W. S. Morrish ..<br>Miss J. D. Graham ..<br>Miss C. L. Davis ..<br>Miss R. Smith ..<br>Mrs. R. de Crespigny ..<br>Miss A. Mongredien ..<br>R. Smith ..<br>Miss E. Lewis ..<br>A. J. Couche .. | 1 1 0<br>1 1 0<br>3 10 0<br>4 4 0<br>4 0 0<br>4 4 0<br>4 4 0<br>3 3 0<br>1 11 6<br>5 0 0<br>3 3 0<br>3 3 0<br>3 3 0<br>2 10 0<br>2 2 0<br>2 2 0<br>1 10 0 |  |
| UNCLAIMED PRIZES OF PREVIOUS YEARS DISTRIBUTED IN 1895. |      |  |   |  |   |   |  |
| 698   | 7 7  | C. Hann ..   | Beaminster, Dorset ..   | { 'Roses' .. ..<br>'The Pine Ridge' .. ..<br>'Milkman's Daughter' .. ..<br>'The River Dart' .. ..<br>'The Bend of the Exe' .. ..   | Miss B. Guilloid ..<br>J. E. Grace ..<br>Miss M. Hickson ..<br>H. S. Jackson ..<br>H. S. Jackson ..   | 7 7 0<br>20 0 0<br>5 5 0<br>2 10 0<br>2 10 0  |  |
| 1,215   | 20 0 | T. King ..   | Full Moon, Twerton, Bath ..   |  |   |   |  |
| 966   | 5 5  | J. Cooper ..                                       | { Weighbridge House, Corsaley, Wilts .. ..<br>18, Milson Street, Bath .. .. |  |   |   |  |
| 1,131   | 2 10 | J. C. Egerton ..                                   | { Granby House, St. John's Road, Bedminster, Bristol ..                     |  |   |   |  |
| 647   | 2 10 | W. E. Gardner ..                                   |   |  |   |   |  |

### UNCLAIMED PRIZES OF PREVIOUS YEARS DISTRIBUTED IN 1895.

|       |      |               |  |                       |                 |        |
|-------|------|---------------|--|-----------------------|-----------------|--------|
| 693   | 7 7  | C. Hann       | Beamister, Dorset  | ‘Roses’               | Miss B. Guillod | 7 7 0  |
| 215   | 20 0 | T. King       | Full Moon, Twerton, Bath                                 | ‘The Pine Ridge’      | J. E. Grace     | 20 0 0 |
| 966   | 5 5  | J. Cooper     | { Weighbridge House, Corseley,<br>Wiltshire }            | ‘Milkman’s Daughter’  | Miss M. Hickson | 5 5 0  |
| 1,181 | 2 10 | J. C. Egerton | 18, Milsom Street, Bath                                  | ‘The River Dart’      | H. S. Jackson   | 2 10 0 |
| 647   | 2 10 | W. E. Gardner | { Granby House, St. John’s<br>Road, Badminton, Bristol } | ‘The Bend of the Exe’ | H. S. Jackson   | 2 10 0 |

## Bath and West and Southern Counties Society.

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### OBJECTS OF THE SOCIETY AND PRIVILEGES OF MEMBERSHIP.

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#### ANNUAL EXHIBITIONS.

The Society holds an Annual Exhibition in some city or town in England or Wales. Each section of the Society's district is visited at intervals, so that every Member has an opportunity of seeing the Show in his own neighbourhood every few years. Prizes to a large amount are given for Horses, Cattle, Sheep, Pigs, Dairy Produce, &c. Provision is also made for the exhibition of Agricultural Implements and Machinery, Seeds, Cattle Foods, Artificial Manures, and articles of general utility. A substantially-built and completely-equipped Working-Dairy on a large scale is a special feature of these Exhibitions. Here lectures, discussions, explanatory demonstrations, and comparative tests of implements and processes are carried on with the assistance of well-known practical and scientific experts, and Butter-making Competitions for valuable prizes are held. Among other features of the Annual Meeting are Horse Shoeing and Sheep Shearing Competitions, Poultry and Horticultural Shows, and Exhibitions illustrative of Bee-keeping, Home Industries, Art-Manufactures, and the Fine Arts.

*Membership entitles to free admission to the Annual Exhibition, and also to the Grand Stand overlooking the Horse and Cattle Ring, to the Reserved Seats in the Working Dairy and to the use of the Special Pavillion for Reading, Writing, &c., provided for Governors and Members.*

*Entries can be made by Members (elected on or before February 1st preceding the Show) at 10s. per entry for Horses, and 5s. per entry for Cattle, Sheep and Pigs. Non-Members are required to pay £1 per entry for Horses and 15s. per entry for the other Stock named. Similar reductions in the Fees in the Farm Produce and other Classes are made to Members.*

#### THE JOURNAL.

*All Members receive free of charge the Society's Journal, which is published annually, bound in cloth. It has for its aim the dissemination of agricultural knowledge in a popular form, and in addition to original articles by well-known agricultural authorities, it contains particulars of the Society's general operations, full reports of its experimental and research work, prize awards, financial statements, lists of Members, review of new books on agriculture, &c. (The price of the Journal to non-Members is 6s. 5d. post free.)*

#### CHEMICAL AND BOTANICAL FACILITIES.

The Society has a Consulting Chemist (Dr. J. A. Voeleker, M.A., F.I.C., &c.) and a Consulting Botanist (Mr. W. Carruthers, F.R.S.), from whom Members can obtain analyses and reports at reduced rates of charge.

#### EXPERIMENTS.

Experiments on Crops are conducted at experimental stations in various parts of the kingdom, and Members are enabled to take part in these and to receive reports thereon.

ociety has also an experimental station and laboratory attached to its school, and a similar department for carrying on researches in connection with seed-making. Here systematic investigations are conducted by a scientific staff in conjunction with practical experts, *detailed reports of which are sent to Members.*

#### **TECHNICAL EDUCATION.**

view to promoting Technical Education in Agriculture, and in connection specially, the Society provides travelling Butter Schools fully equipped with competent teachers, plant, &c., for public bodies. At the present time the Society is conducting Schools, wherein daily instruction is given to Students, County Councils. The Society has also a fixed Cheese School in which where Students are received and boarded. Both the Butter and Cheese Schools are under the inspection of the Board of Agriculture, which has shown appreciation of the work by substantial grants in aid. *Members are free to witness the Teaching and Competitions at any of the Society's Schools.*

ociety has also a Travelling Farriery School for promoting improvement in the breeding of Horses.

#### **FINE ART AND ART-MANUFACTURES.**

the objects for which the Society was founded was the encouragement of the arts, as well as Agriculture, and, to this end, exhibitions of Paintings and Art-Manufactures are annually held. The special aims of the Society in connection with this department are:—1st. The encouragement of young artists, and of local efforts to bring art-workmanship to bear in the production of useful articles. 2nd. The exhibition of such art treasures as are in private or other collections, to which the public, ordinarily, have no access.

No charge is made to Artists for the exhibitions of their Paintings, and in order to promote the sale of meritorious works, an Art Union is held, the members of which are selected from the Pictures exhibited, a large sum being voted by the Society towards their purchase.

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### **TERMS OF MEMBERSHIP.**

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#### **ANNUAL SUBSCRIPTIONS.**

|   |      |
|---|------|
| Ordinary Members, not less than   | £1   |
| Land Farmers, the rateable value of whose holdings does not exceed £200 a-year, not less than | 10/- |

Persons, who are eligible for election as President or Vice-President, and who subscribe not less than £2, are entitled, in addition to the privileges already mentioned, to an extra Season Ticket for the Annual Exhibition and to the Annual Show, &c. Governors subscribing more than £2 are entitled to a further £1 for every additional £1 subscribed.

Persons subscribing less than £1 are entitled to all the privileges of Membership, that of entering Stock at reduced fees, and their admission Ticket to the Annual Show is available for *one day only* instead of for the whole time of exhibition.

#### **LIFE COMPOSITIONS.**

Persons may compound for their Subscriptions for future years by payment, in advance, of £20; and Members by payment, in advance, of £10. Governors who have subscribed for 20 years may become Life-Members on payment of half these amounts.

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Persons desirous of joining the Society can be proposed by a Member, or Secretary (THOS. F. PLOWMAN, 4, Terrace Walk, Bath).

## Bath and West and Southern Counties Society.

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### GENERAL LAWS,

*As revised in accordance with the Report of a Special Committee; which Report was received and adopted by the Annual General Meeting of Members, held on May 30, 1895.*

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#### COMPOSITION OF THE SOCIETY.

I. The Society shall consist of a President, Vice-Presidents, Trustees, Council, Treasurer, Secretary, and Members.

#### OBJECTS.

II. The Society shall have the following objects:—

- a. To hold exhibitions of breeding stock, agricultural implements, and such other articles connected with agriculture, arts, manufactures or commerce as may be determined upon by the Council.
- b. To conduct practical and scientific investigations in agriculture.
- c. To promote technical education in agriculture by providing means of systematic instruction.
- d. To publish a Journal for circulation.

#### SUBSCRIPTIONS.

III. The Annual Subscriptions for Members shall be as follows:—

|  |      |
|--|------|
| Governors (who are eligible for election as President or Vice-President) not less than .. .. .         | £2   |
| Ordinary Members, not less than .. .. .  | £1   |
| Tenant Farmers (the rateable value of whose holding does not exceed £200 a-year) not less than .. .. . | 10/- |

IV. The payment of £20 in one sum shall constitute a Governor for life, and of £10 in one sum an Ordinary Member for life; but any Governor who has subscribed not less than £2 annually for a period of twenty years may become a life Governor on the further payment of £10 in one sum; and any Ordinary Member, who has subscribed not less than £1 annually for the same period, may become a Member on the further payment of £5 in one sum.

Subscriptions shall become due and be payable in advance on the 1st of January in each year or as soon as the Subscriber has been elected a Member. When the election takes place during the last quarter of the year the subscription payable on election will be considered as applying to the ensuing year.

V. A Member shall be liable to pay his subscription for the current year unless he shall have given notice in writing, to the Secretary before January 1st, of his intention to withdraw.

#### MANAGING BODY.

The Council, consisting of the President, Vice-Presidents, Trustees, and Secretary, shall have the management of the Society—including the making of Bye-Laws, the admission and expulsion of Members, determining the Prizes to be awarded, appointing or removing Trustees, fixing the Places of Meetings and Exhibitions, appointing or removing the Treasurer, Secretary and such other officers as may be required to carry on

he business of the Society—shall be vested in the Council, who shall report its proceedings at the annual meetings of the Society.

VIII. The Council shall consist of the Patron (if any), President, Vice-Presidents, Trustees, and Treasurer (who shall be *ex-officio* Members), and of sixty-six elected Members.

#### ELECTION OF PRESIDENT, VICE-PRESIDENTS, TRUSTEES, AND COUNCIL.

IX. The election of a President for the year, of any additional Vice-President, of Trustees, and of the Members of Council representing the Divisions named in Law X., shall take place at the Annual Meeting of the Society, and they shall enter into office at the conclusion of the exhibition during which such Annual Meeting has been held.

X. The sixty-six Members of the Council referred to in Laws VIII. and IX. shall consist of fifty-eight persons residing or representing property in the following Divisions, viz. :—

Twelve from the Counties of Devon and Cornwall, which shall be called the Western Division ;

Twenty-four from the Counties of Somerset, Dorset, and Wilts, which shall be called the Central Division ;

Twelve from the Counties of Hants, Berks, Oxon, Bucks, Middlesex, Surrey, Sussex, and Kent, which shall be called the Southern Division ; and

Ten from the Counties of Worcester, Gloucester, Hereford and Monmouth, and the Principality of Wales, which shall be called the North-Western Division.

The remaining eight shall be elected (irrespective of locality) from the general body of Members, and shall form a Division which shall be called the "Without Reference to District" Division.

XI. One half of the elected Members in each of the five Divisions named in Law X. shall retire annually by rotation, but shall be eligible for re-election.

XII. The Council shall have power to nominate a President, Vice-Presidents, Trustees, and Members of Council for the approval of the annual meeting, and to fill up such vacancies in their own body as are left after the annual meeting, or as may from time to time occur during the interval between the annual meetings.

XIII. Nominations to offices, election to which is vested in the whole body of Members, must reach the Secretary ten days before the meeting at which such vacancies are to be filled up.

#### MEETINGS.

XIV. The annual meeting of the Society shall take place during the holding of the annual exhibition.

XV. Special general meetings of the Society may be convened by the President on the written requisition of not less than three Members of Council ; and all Members shall have ten days' notice of the object for which they are called together.

XVI. No Member of less than three months' standing, or whose subscription is in arrear, shall be entitled to vote at a meeting.

#### EXHIBITIONS.

XVII. The annual exhibitions of the Society shall be held in different Cities or Towns in successive years.

XVIII. All Exhibitors shall pay such fees as may be fixed by the Council. Members subscribing not less than £1 per annum, who have been elected previous to February 1st, and have paid the subscription for the current year, shall be entitled to exhibit at such reduction in these fees as the Council shall determine.

**PRIZES.**

XIX. All prizes offered at the cost of the Society shall be open for competition to the United Kingdom.

XX. No person intending to compete for any prize offered at the annual exhibition shall be eligible to act as a judge or to have any voice in the selection of judges to award the premiums in the department in which he exhibits.

XXI. If it be proved to the satisfaction of the Council that any person has attempted to gain a prize in this, or in any other Society, by a false certificate or by a misrepresentation of any kind, such person shall thereupon be for the future excluded from exhibiting in this Society.

**JOURNAL.**

XXII. The Proceedings of the Society, Awards of Prizes, Financial Statements, and List of Officers, Governors and Members shall be printed annually in the Society's Journal, and every Governor and Member, not in arrear with his subscription, shall be entitled to receive one copy, free of expense, and there shall be an additional number printed for sale.

**POLITICS.**

XXIII. No subject or question of a political tendency shall be introduced at any meeting of this Society.

**ALTERATIONS IN LAWS.**

XXIV. No new General Law shall be made or existing one altered, added to or rescinded, except at an annual or special general meeting, and then only provided that a statement of particulars, in writing, shall have been sent to the Secretary at least twenty-one days previous to the meeting at which the question is to be considered.

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**List of Officers.**

1895-96.

**ST. ALBANS MEETING.****PATRON.**

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

**PRESIDENT FOR 1895-96.**

THE RIGHT HON. EARL OF CLARENDON, The Grove, Watford.

**TRUSTEES.**

- \*ACLAND, THE RIGHT HON. SIR THOMAS DYKE, Bart., Killerton, Exeter.  
 PAGET, THE RIGHT HON. SIR RICHARD HORNER, Bart., Cranmore & Shepton Mallet.  
 LENNARD, SIR JOHN FARNABY, Bart., Wickham Court, West Wickham, K

**VICE-PRESIDENTS.**

- YORK, H.R.H. THE DUKE OF, K.G. . . . . York House, London, S.W.  
 \*ACLAND, RIGHT HON. SIR T. D., Bart. . . . . Killerton, Exeter  
 ACLAND, C. T. D. . . . . Killerton, Exeter  
 \*AMHERST, EARL . . . . . Montreal, Sevenoaks, Kent  
 BARNETT, H. . . . . Glympton Park, Woodstock  
 \*BATH, MARQUESS OF. . . . . Longleat, Warminster  
 BELFIELD, JOHN . . . . . Primley Hill, Torquay  
 \*BENYON, RICHARD . . . . . Englefield House, Reading  
 BRYMER, W. E., M.P. . . . . Ilslington House, Dorchester  
 \*CARLINGFORD, LORD . . . . . Chewton Mendip, Somerset [De  
 \*CLINTON, LORD . . . . . Heanton Satchville, Beaford, .  
 \*CORK AND ORRERY, EARL OF . . . . . Marston, Frome [C  
 \*COVENTRY, EARL OF . . . . . Croome Court, Severn Stoke, V  
 \*DARNLEY, EARL OF . . . . . Cobham Hall, Gravesend  
 DAW, R. R. M. . . . . Spurbarne, Exeter  
 DEVONSHIRE, DUKE OF, K.G. . . . . Chatsworth, Derbyshire  
 DIGBY, G. D. W. . . . . Sherborne Castle, Sherborne  
 \*DUCIE, EARL OF . . . . . Tortworth, Falfeld, R.S.O.  
 \*FITZHARDINGE, LORD . . . . . Berkeley Castle, Gloucester  
 \*FORTESCUE, EARL . . . . . Castle Hill, South Molton  
 GIBBS, A. . . . . Tyntesfield, Bristol  
 GORING, REV. J. . . . . Wiston Park, Steyning  
 HIPPLESLEY, J. H. . . . . Ston Easton, Somerset  
 HULSE, SIR E., Bart. . . . . Breamore, Salisbury  
 \*ILCHESTER, EARL OF . . . . . Melbury, Dorchester  
 \*JERSEY, EARL OF . . . . . Middleton Park, Bicester, Oxon.  
 KNYFTON, T. TUTTON . . . . . Uphill, Weston-super-Mare  
 \*LANDSDOWNE, MARQUESS OF, K.G. . . . . Bowood, Calne  
 LEONFIELD, LORD . . . . . Petworth House, Sussex [P  
 LENNARD, SIR J. F., Bart. . . . . Wickham Court, West Wickh  
 \*LLEWELYN, SIR J. T. D., Bart., M.P. . . . . Penllergare, Swansea  
 \*LOPES, SIR M., Bart. . . . . Maristow, Roborough, S. Devon

\* Those to whose names an asterisk (\*) is prefixed have filled the office of President.

VICE-PRESIDENTS—*continued.*

|  |                                  |
|--|----------------------------------|
| LOYD, LEWIS . . . . .                          | Monk's Orchard, Bromley, Kent    |
| MILDMAY, SIR H. ST. JOHN, Bart. . . . .        | Dogmersfield Park, Winchfield    |
| MOORE-STEVENS, J. C. . . . .                   | Winscott, Great Torrington       |
| MORETON, LORD. . . . .                         | Sarsden House, Chipping Norton   |
| *MORLEY, EARL OF . . . . .                     | Saltram, Plympton, Devon         |
| MORRELL, G. HERBERT, M.P. . . . .              | Headington Hill Hall, Oxford     |
| *MOUNT-EDGCUMBE, EARL OF . . . . .             | Saltrim, Plympton, Devon         |
| NEVILLE-GRENVILLE, R. . . . .                  | Butleigh Court, Glastonbury      |
| NORTHUMBERLAND, DUKE OF . . . . .              | Albury Park, Guildford           |
| *ONSLOW, EARL OF . . . . .                     | 7, Whitehall Place, London, S.W. |
| PAGET, THE RIGHT HON. SIR R. H., Bart. . . . . | Cranmore Hall, Shepton Mallet    |
| PINNEY, W. . . . .                             | Somerton                         |
| POLTIMORE, LORD . . . . .                      | Poltimore, Exeter [Hants         |
| PORTAL, MELVILLE . . . . .                     | Laverstock House, Micheldever,   |
| SAINT GERMAN, EARL OF . . . . .                | Port Elliot, Devonport           |
| STORY-MASKELYNE, N. . . . .                    | Basset Down House, Swindon       |
| STUCLEY, SIR G. S., Bart. . . . .              | Moreton, Bideford, N. Devon      |
| *TEMPLE, EARL . . . . .                        | Newton Park, Bath.               |
| THYNNE, LORD HENRY . . . . .                   | Muntham, Worthing                |
| *TREDGAR, LORD . . . . .                       | Tredgar Park, Newport, Monmouth  |
| *TREMAYNE, JOHN . . . . .                      | Heligan, St. Austell             |
| TROYTE, COL. . . . .                           | Huntsham Court, Bampton, Devon   |
| *WARWICK, EARL OF . . . . .                    | Warwick Castle                   |
| WEYMOUTH, VISCOUNT, M.P. . . . .               | Widcombe House, Bath             |
| WINCHESTER, MARQUESS OF . . . . .              | Amport St. Mary's, Andover       |
| WINDSOR, LORD . . . . .                        | Hewell Grange, Bromsgrove        |

THE LORD WARDEN OF THE STANNARIES.

THE SURVEYOR-GENERAL OF THE DUCHY OF CORNWALL.

THE RECEIVER-GENERAL OF THE DUCHY OF CORNWALL.

\*.\* Those to whose names an asterisk (\*) is prefixed have filled the office of President.

**ELECTED MEMBERS OF COUNCIL.**

**WESTERN DIVISION (DEVON AND CORNWALL).**

(12 Representatives.)

| <i>Elected in 1894:—</i> |                          | <i>Elected in 1895:—</i> |                         |
|--------------------------|--------------------------|--------------------------|-------------------------|
| <i>Name.</i>             | <i>Address.</i>          | <i>Name.</i>             | <i>Address.</i>         |
| COLLINS, C. R. . .       | Hartwell House, Exeter   | CALMADY, V. P. . .       | Tetcott, Holsworthy     |
| MARRER, RICHARD .        | Combe, Honiton           | LYMOND, FRANCIS W.       | Bampfylde House, Exeter |
| SHELLY, SIR J. . Bt.     | Shobrooke Park, Crediton | SANDERS, E. J. . .       | Stoke House, Exeter     |
| WILLIAMS, SIR W. R.,     |                          | SILLIFANT, A. O. .       | Coombe, Copplestone     |
| Bart. . . . .            | Heanton, Barnstaple      | TROOD, COL. R. . .       | Matford, Exeter         |
| WIPPELL, RICHARD .       | Rudway, Thorverton       | WALBROND, SIR W. H.,     |                         |
| WYATT-EDGEELL, COL.      |                          | Bart., M.P. . . .        | Bradfield, Cullompton   |
| ARTHUR . . . . .         | Cowley House, Exeter     |                          |                         |

**CENTRAL DIVISION (SOMERSET, DORSET, AND WILTS).**

(24 Representatives.)

|                       |                                    |                     |                                   |
|-----------------------|------------------------------------|---------------------|-----------------------------------|
| ALLEN, JAMES D. . .   | Springfield House, Shepton Mallet  | BROWN, W. J. . . .  | Middlehill House, Box, Wills      |
| BEST, COL. G. . . .   | Charlton House, Ludwell, Salisbury | CHORLEY, W. L. . .  | Quarme, Dunster                   |
| DANGER, THOMAS . .    | Rowford Lodge, Taunton             | DIGBY, J. K. W.,    | M.P. . . . .                      |
| HOBHOUSE, H., M.P.    | Hadspen House, Castle Cary         | DTYKE, THOMAS . .   | Sherborne Castle, Sherborne       |
| LLEWELLYN, E. H.,     | Langford Court, Langford, Somerset | EDWARDS, C. L. F. . | Long Ashton Lodge, Clifton        |
| M.P. . . . .          |                                    |                     | The Court, Axbridge, Somerset     |
| MAULE, M. ST. J. . .  | Chapel House, Bath                 | FARWELL, F. G. . .  | 11, Laura Place, Bath             |
| NAPIER, H. B. . . .   | Chippenham                         | FOWLER, W. H. . .   | Claremont, Taunton                |
| SHERSTON, CAPT. J. D. | Evercreech, Bath                   | GIBBONS, G. . . . . | Tunley Farm, near Bath            |
| WILLIAMS, E. W. . .   | Herrington, Dorchester             | HOOD, SIR A. AC-    |                                   |
|                       |                                    | LAND, Bart., M.P.   | St. Audries, Bridgwater           |
|                       |                                    | *JONES, H. P. . . . | Beaufort House, Winchester        |
|                       |                                    | SANFORD, E. C. A. . | Nynehead, Wellington, Somerset    |
|                       |                                    | SKINNER, A. C. . .  | Pound, Bishop's Lydeard, Somerset |

**SOUTHERN DIVISION (HANTS, BERKS, OXON, BUCKS, MIDDLESEX, SURREY, SUSSEX, AND KENT).**

(12 Representatives.)

|                       |   |                      |                                 |
|-----------------------|---|----------------------|---------------------------------|
| DRUCE, A. F. M. . .   | Bladon House, Woodstock                     | ASHCROFT, W. . . .   | Hayes, Beckenham, Kent          |
| *KNOLLYS, C. R. . .   | Grange Estate Office, Aylesford, Hants      | BOTTLER, CAPT. W. J. |                                 |
| STANFORD, A. . . .    | Eatona, Steyning                            | CASBERD . . . . .    | The Elms, Taplow                |
| WARRE, F. . . . .     | 44, Great Ormond Street, Bloomsbury, London | CUNDALL, H. M.,      |                                 |
| WHITEHEAD, C., F.L.S. | Barnling House, Maldstone                   | F.S.A. . . . .       | Richmond, Surrey                |
| WILLIAMS, A. G. . .   | Portsea, Hants                              | GILL, FREDERICK .    | Speenhamland, Newbury           |
|                       |   | PAIN, C. . . . .     | Longstock, Stockbridge, Hants   |
|                       |   | SUTTON, MARTIN J. .  | Kidmore Grange, Caversham, Oxon |

**NORTH-WESTERN DIVISION (WORCESTERSHIRE, GLOUCESTERSHIRE, HEREFORDSHIRE, MONMOUTHSHIRE, AND WALES).**

(10 Representatives.)

|                     |                            |                     |                             |
|---------------------|----------------------------|---------------------|-----------------------------|
| ARKWRIGHT, J. H. .  | Hampton Court, Leominster  | BAKER, G. E. LLOYD- | Hardwicke Court, Gloucester |
| MARTIN, G. E. . . . | Ham Court, Upton-on-Severn | BEST, CAPT. J. C. . | Vivod, Llangollen           |
| MASON, A. . . . .   | North Hill, Swansea        | BUCK, A. . . . .    | Worcester                   |
| PHILLIPS, C. D. . . | Newport, Mon.              | SMITH, J. W. . . .  | Thinghill Court, Hereford   |
|                     |                            | TAYLOR, H. W. . .   | Showle Court, Ledbury       |

**WITHOUT REFERENCE TO DISTRICT DIVISION.**

(8 Representatives.)

|                     |                       |                     |                                  |
|---------------------|-----------------------|---------------------|----------------------------------|
| GORING, C. . . . .  | Wiston Park, Steyning | COBB, H. M. . . . . | Higham, Kent                     |
| LATHAM, T. . . . .  | Dorchester, Oxon      | NAFER, COL. W. D. . | 50, Queen's Gate Terrace, London |
| LEY, J. H. . . . .  | Trehill, Exeter       | RYLAND, HOWARD P.   | Moxhall Park, Erdington, Warwick |
| VOSPER, W. P. . . . | Merafield, Plympton   | SEYMOUR, R. A. H. . | 46, Earl Street, Maldstone       |

**EX-OFFICIO MEMBERS.**

THE TREASURER . . . . . BADCOCK, HENRY JEFFRIES, Somersetshire Bank, Taunton.  
THE CONSULTING SURVEYOR . . . SPACKMAN, HENRY, 6, Terrace Walk, Bath.

\* The name of this Member, who has recently changed his address, will be transferred to the Southern Division when any vacancy occurs.

**STANDING COMMITTEES, 1895-96.**[The PRESIDENT is *ex-officio* Member of all Committees.]**AGRICULTURAL EDUCATION.**PAGET, RIGHT HON. SIR R. H., Bart., *Chairman.*

|                                   |                     |                           |
|-----------------------------------|---------------------|---------------------------|
| ACLAND, RT. HON. SIR T. D., Bart. | EDWARDS, C. L. F.   | LATHAM, T.                |
| ACLAND, C. T. D.                  | GIBBONS, G.         | LENNARD, SIR J. F., Bart. |
| ALLEN, J. D.                      | GORING, REV. J.     | LLEWELLYN, E. H. (M.P.)   |
| BEST, COL. G.                     | HOBHOUSE, H. (M.P.) | MASKELYNE, N. STORY-      |
|                                   | KNOLLYS, C. R.      | SUTTON, M. J.             |

(With power to add to their number.)

**ALLOTMENT.**BEST, CAPT. J. C., *Chairman.*

|                        |                         |                        |
|------------------------|-------------------------|------------------------|
| BOTELE, CAPT. W. J. C. | LLEWELLYN, E. H. (M.P.) | NEVILLE-GRENVILLE, R.  |
| EDWARDS, C. L. F.      | NAPIER, H. B.           | SHELLEY, SIR J., Bart. |
| GIBBONS, G.            |                         |                        |

**ARTS AND MANUFACTURES.**ACLAND, RIGHT HON. SIR T. D., Bart., *Chairman.*WYATT-EDGEELL, COL. A., *Vice-Chairman.*

|                         |                       |                    |
|-------------------------|-----------------------|--------------------|
| ACLAND, C. T. D.        | MOORE-STEVENS, J. C.  | WEYMOUTH, VISCOUNT |
| CUNDALL, H. M. (F.S.A.) | MORRELL, G. H. (M.P.) | (M.P.)             |
| DAW, R. R. M.           | NAPER, COL. W. D.     | WILLIAMS, E. W.    |
| FARWELL, F. G.          |                       |                    |

(With power to add to their number.)

**CONTRACTS AND REFRESHMENTS.**BEST, CAPT. J. C., *Chairman.*

|                         |               |                       |
|-------------------------|---------------|-----------------------|
| BOTELE, CAPT. W. J. C.  | MASON, A.     | NEVILLE-GRENVILLE, R. |
| EDWARDS, C. L. F.       | NAPIER, H. B. | SANFORD, E. C. A.     |
| LLEWELLYN, E. H. (M.P.) |               |                       |

**DAIRY.**ACLAND, C. T. D., *Chairman.*

|                                   |                           |                                  |
|-----------------------------------|---------------------------|----------------------------------|
| ACLAND, RT. HON. SIR T. D., Bart. | GIBBONS, G.               | NEVILLE-GRENVILLE, R.            |
| ALLEN, J. D.                      | KNOLLYS, C. R.            | PAGET, RT. HON. SIR R. H., Bart. |
| ASHCROFT, W.                      | LATHAM, T.                | SANFORD, E. C. A.                |
| EDWARDS, C. L. F.                 | LENNARD, SIR J. F., Bart. | WIPPELL, R.                      |
| FOWLER, W. H.                     | MASKELYNE, N. STORY-      |                                  |
|                                   | NAPIER, H. B.             |                                  |

**DISQUALIFYING.**

THE STEWARDS OF HORSES.

THE STEWARDS OF STOCK.

THE STEWARDS OF POULTRY.

**EXPERIMENTAL.**ACLAND, RIGHT HON. SIR T. D., Bart., *Chairman.*

|                   |                           |                                  |
|-------------------|---------------------------|----------------------------------|
| ACLAND, C. T. D.  | GIBBONS, G.               | NEVILLE-GRENVILLE, R.            |
| ALLEN, J. D.      | KNOLLYS, C. R.            | NAPIER, H. B.                    |
| ASHCROFT, W.      | LENNARD, SIR J. F., Bart. | PAGET, RT. HON. SIR R. H., Bart. |
| DYKE, T.          | LLEWELLYN, E. H. (M.P.)   | SUTTON, M. J.                    |
| EDWARDS, C. L. F. | MASKELYNE, N. STORY-      |                                  |
| FOWLER, W. H.     |                           |                                  |

(With power to add to their number.)

**FINANCE.**BEST, CAPT. J. C., *Chairman.*

MARTIN, G. E.

**REGULATIONS.**BEST, CAPT. J. C., *Chairman.*

|                         |                |                        |
|-------------------------|----------------|------------------------|
| BOTELE, CAPT. W. J. C.  | GIBBONS, G.    | NAPIER, H. B.          |
| EDWARDS, C. L. F.       | KNOLLYS, C. R. | NEVILLE-GRENVILLE, R.  |
| LLEWELLYN, E. H. (M.P.) |                | SHELLEY, SIR J., Bart. |
|                         |                |                        |

**JOURNAL.**

|                  |   |                      |               |
|------------------|---|----------------------|---------------|
| ACLAND, C. T. D. | ACLAND, RIGHT HON. SIR T. D., Bart., <i>Chairman.</i> | MDMOND, F. W.        | MARTIN, G. E. |
|                  |   | MASKELYNE, N. STORY- |               |

**JUDGES' SELECTION.**

|                |   |                      |                        |
|----------------|---|----------------------|------------------------|
| ALLEN, J. D.   | LENNARD, SIR J. F., Bart., <i>Chairman.</i> | DRUCE, A. F. M.      | SHELLEY, SIR J., Bart. |
| BEST, COL. G.  |   | GIBBONS, G.          | SMITH, J. W.           |
| BROWN, W. J.   |   | MOORE-STEVENS, J. C. | WILLIAMS, E. W.        |
| CHORLEY, W. L. |   |                      |                        |

**RAILWAY ARRANGEMENTS AND ADVERTISEMENTS.**

|                   |                           |                        |
|-------------------|---------------------------|------------------------|
| AMHERST, EARL     | DRUCE, A. F. M.           | MASON, A.              |
| BEST, CAPT. J. C. | ILCHESTER EARL OF         | MORLEY, EARL OF        |
| CORK, EARL OF     | LENNARD, SIR J. F., Bart. | SHELLEY, SIR J., Bart. |
| COVENTRY, EARL OF | LOPES, SIR M., Bart.      |                        |

(With power to add to their number.)

**STOCK PRIZE-SHEET.**

|                 |   |                      |                        |
|-----------------|---|----------------------|------------------------|
| ALLEN, J. D.    | LENNARD, SIR J. F., Bart., <i>Chairman.</i> | FOWLER, W. H.        | SHELLEY, SIR J., Bart. |
| BEST, COL. G.   |   | GIBBONS, G.          | STANFORD, A.           |
| BROWN, W. J.    |   | MARKER, R.           | WEYMOUTH, VISCOUNT     |
| DANGER, T.      |   | MOORE-STEVENS, J. C. | (M.P.)                 |
| DRUCE, A. F. M. |   | SANFORD, E. C. A.    | WILLIAMS, E. W.        |

**Stewards.**

|                                |                           |
|--------------------------------|---------------------------|
| <i>Arts.</i>                   | <i>Horticulture.</i>      |
| CUNDALL, H. M. (F.S.A.)        | FOWLER, W. H.             |
| FARWELL, F. G.                 | <i>Music.</i>             |
| <i>Butter Test.</i>            | NAPHER, COL.              |
| WEYMOUTH, VISCOUNT (M.P.)      | <i>Poultry.</i>           |
| <i>Cattle, Sheep and Pigs.</i> | SANDERS, E. J.            |
| DRUCE, A. F. M.                | <i>Shearing.</i>          |
| SHELLEY, SIR J., Bart.         | DRUCE, A. F. M.           |
| LENNARD, SIR J. F., Bart.      | <i>Shoeing.</i>           |
| <i>Cider.</i>                  | BEST, COL. G.             |
| FARWELL, F. G.                 | <i>Assistant Steward.</i> |
| <i>Dairy.</i>                  | LATHAM, T.                |
| GIBBONS, G.                    | <i>Works.</i>             |
| KNOLLYS, C. R.                 | NAPIER, H. B.             |
| <i>Experiments.</i>            | <i>Yard.</i>              |
| KNOLLYS, C. R.                 | BEST, CAPT. J. C.         |
| DYKE, T.                       | EDWARDS, C. L. F.         |
| <i>Forage.</i>                 | BOTELER, CAPT. W. J. C.   |
| SKINNER, A. C.                 | <i>Assistant Steward.</i> |
| <i>Hops.</i>                   | MASON, A.                 |
| WHITEHEAD, C. (F.L.S.)         |                           |
| <i>Horses.</i>                 |                           |
| WILLIAMS, E. W.                |                           |
| BEST, COL. G.                  |                           |

**Other Honorary Officials.**

|                                       |  |
|---------------------------------------|--|
| <i>Treasurer</i> —BADCOCK, H. J.      | <i>Consulting Surveyor</i> —SPACKMAN, H. |
| <i>Local Treasurer</i> —DYMOND, F. W. | <i>Chaplain</i> —REV. H. EVERETT, M.A.   |

**Permanent Staff.**

|  |                                 |
|--|---------------------------------|
| <i>Secretary</i> —PIOWMAN, THOMAS F.         | <i>Consulting Botanist.</i>     |
| <i>Editor of 'Journal.'</i>                  | CARRUTHERS, W. (F.R.S.)         |
| Associate Editor.                            | <i>Veterinary Inspector.</i>    |
| PIOWMAN, THOS. F. LLOYD, F. J. (F.I.C.)      | BROWN, PROF. G. T. (C.B.)       |
| <i>Auditor.</i>                              | <i>Superintendent of Works.</i> |
| GOODMAN, A. ( <i>Chartered Accountant.</i> ) | ROSSITER, J.                    |
| <i>Consulting Chemist.</i>                   |                                 |
| VOELCKER, DR. J. A. (M.A., F.I.C.)           |                                 |

## Members' Privileges.

### EXAMINATION OF PLANTS AND SEEDS.

**Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested, in applying for Examination of Plants and Seeds, to state that they do so as Members of the first-named Society.**

**THE Council have arranged for the following rates of charge for the examination, by the Society's Consulting Botanist, of Plants and Seeds for the *bond fide* and individual information and benefit of Members of the Society (not being seedsmen). The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid.**

No.

- 1.—A report on the purity and germinating power of a sample of seed, stating the sorts and amount of any other seeds found therein . . . . . 1s.
- 2.—Determination of the species of any weed or other plant, or of any epiphyte or vegetable parasite, with a report on its habits, and the means for its extermination or prevention . . . . . 1s.
- 3.—Report on any disease affecting farm crops . . . . . 1s.
- 4.—Determination of the species of a collection of natural grasses found in any district, with a report on their habits and pasture value . . . . . 5s.

*N.B.—The Consulting Botanist's Reports on Seeds are furnished to enable Members,—purchasers of seeds and corn for Agricultural or Horticultural purposes,—to test the value of what they buy, and not to be used or made available for advertising or trade purposes.*

### PURCHASE OF SEEDS.

The purchaser should obtain from the vendor, by invoice or otherwise, a proper designation of the seed he buys, with a guarantee that it contains not more than a specified amount of other seeds, and is free from ergot, or, in the case of clovers, from dodder, and of the percentage of seeds that will germinate.

The germination of cereals, green crops, clover, and timothy grass should be not less than 90 per cent.; of fox-tail not less than 60 per cent.; of other grasses not less than 70 per cent.

The Council strongly recommend that the purchase of prepared mixtures should be avoided, and that the different seeds to be sown should be purchased separately.

### INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES.

#### I. SEEDS.

In sending seed or corn for examination the utmost care must be taken to secure a fair and honest sample. In the case of grass-seeds the sample should be drawn from the centre of the sack or bag, and in all cases from the bulk delivered to the purchaser and not from the purchase sample. When bought by sample, the whole or part of that sample should also be sent.

When it is considered necessary to secure legal evidence, the sample should be taken from the bulk and placed in a sealed bag in the presence of a reliable witness who is acquainted with the identity of the bulk, and care should be taken that the purchased sample and bulk be not tampered with after delivery, or mixed or come in contact with any other sample or stock.

One ounce of grass and other small seeds should be sent, and two ounces of clover or larger seeds. The exact name under which the seed has been purchased should be sent with it.

Grass-seeds should be sent at least **FOUR WEEKS**, and clover-seeds **TWO WEEKS** before they are required and must not be sown until the report has been received.

#### II. PLANTS.

In collecting specimens of plants, the whole plant should be taken up, and the roots shaken from the roots. If possible, the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of information required, and stating any local circumstances (soil, situation, &c.)

Specimens, in the opinion of the sender, would be likely to throw light on the inquiry. Parcels or letters containing seeds or plants for examination (carriage or postage prepaid) must be addressed to Mr. W. CARRUTHERS, F.R.S., 43, Central

## Members' Privileges.

### ANALYSES OF FERTILISERS, FEEDING-STUFFS, WATERS, SOILS, &c.

*(Applicable only to the case of Persons who are not commercially engaged in the manufacture or sale of any substance sent for Analysis.)*

Members of the Bath and West and Southern Counties Society, who may also be Members of other Agricultural Societies, are particularly requested, in applying for Analyses, to state that they do so as Members of the first-named Society.

THE Council have fixed the following rates of Charges for Chemical Analysis to Members of the Society.

These privileges are applicable only when the Analyses are for *bonâ-fide* agricultural purposes, and are required by Members of the Society for their own use and guidance in respect of farms or land in their own occupation and within the United Kingdom.

The analyses are given on the understanding that they are required for the individual and the benefit of the Member applying for them, and must not be used for other persons, or for commercial purposes.

Land or estate agents, bailiffs, and others, when forwarding samples, are required to state the names of those Members on whose behalf they apply.

Members are also allowed to send for analysis under these privileges any manures or feeding-stuffs to be used by their outgoing tenants, or which are to be given free of cost to their occupying tenants.

The analyses and reports may not be communicated to either vendor or manufacturer, except cases of dispute.

Members are requested, when applying for an analysis, to quote the number in the subjoined schedule under which they wish it to be made.

|    |   |                 |
|----|---|-----------------|
| 0. | —An opinion of the purity of bone-dust or oil-cake (each sample) . . . . .  | 2s. 6d.         |
| 1. | —An analysis of sulphate or muriate of ammonia, or of nitrate of soda, together with an opinion as to whether it be worth the price charged . . . . .   | 5s.             |
| 1. | —An analysis of guano; showing the proportion of moisture, organic matter, sand, phosphate of lime, alkaline salts and ammonia, together with an opinion as to whether it be worth the price charged . . . . .  | 10s.            |
| —  | —An analysis of mineral superphosphate of lime for soluble phosphates only, together with an opinion as to whether it be worth the price charged . . . . .  | 5s.             |
| —  | —An analysis of superphosphate of lime, dissolved bones, &c., showing the proportions of moisture, organic matter, sand, soluble and insoluble phosphates, sulphate of lime, and ammonia, together with an opinion as to whether it be worth the price charged . . . . .                                      | 10s.            |
| —  | —An analysis of bone-dust, basic slag, or any other ordinary artificial manure, together with an opinion as to whether it be worth the price charged . . . . .  | 10s.            |
| —  | —An analysis of compound artificial manures, animal products, refuse substances used for manure, &c. . . . .  | from 10s. to 21 |
| —  | —An analysis of limestone, showing the proportion of lime . . . . .   | 7s. 6d.         |
| —  | —An analysis of limestone, showing the proportion of lime and magnesia . . . . .  | 10s.            |
| —  | —An analysis of limestone or marl, showing the proportion of carbonate, phosphate, and sulphate of lime and magnesia, with sand and clay . . . . .  | 10s.            |
| —  | —Partial analysis of a soil, including determinations of clay, sand, organic matter, and carbonate of lime . . . . .  | 10s.            |
| —  | —Complete analysis of a soil . . . . .  | 23              |
| —  | —An analysis of oil-cake or other substance used for feeding purposes, showing the proportion of moisture, oil, mineral matter, albuminous matter, and woody fibre, as well as of starch, gum, and sugar in the aggregate; and an opinion of its feeding and fattening or milk-producing properties . . . . . | 10s.            |
| —  | —Analysis of any vegetable product . . . . .  | 10s.            |
| —  | —Determination of the "hardness" of a sample of water before and after boiling . . . . .  | 5s.             |
| —  | —Analysis of water of land-drainage, and of water used for irrigation . . . . .   | 27              |
| —  | —Analysis of water used for domestic purposes . . . . .   | 21 10s.         |
| —  | —An analysis of milk (to assist Members in the management of their Dairies and Herds, <i>bonâ fide</i> for their own information and not for trade purposes, nor for use in connection with the Sale of Food and Drugs Acts) . . . . .  | 5s.             |
| —  | —Personal consultation with the Consulting Chemist. (To prevent disappointment it is suggested that Members desiring to hold a consultation with the Consulting Chemist should write to make an appointment) . . . . .  | 5s.             |
| —  | —Consultation by letter . . . . .   | 5s.             |
| —  | —Consultation necessitating the writing of three or more letters . . . . .  | 10s.            |

Members wishing to exercise their privileges on the above-named terms, should forward their samples for examination, *by post or parcel, prepaid*, to the Consulting Chemist, DR. JOHN UGUSTUS VOELCKER, M.A., F.I.C., 22, Tudor Street, New Bridge Street, London, E.C. The fees for analysis must be sent to the Consulting Chemist at the time of application.

## GUIDE TO PURCHASERS OF FERTILISERS AND FEEDING-STUFFS.

UNDER the provisions of the Fertilisers and Feeding Stuffs Act of 1893, District Agricultural Analysts have been appointed throughout the country to examine samples taken in compliance with the Act. Inasmuch, however, as the procedure necessitated in these cases is very complicated, members of the Bath and West and Southern Counties Society will find it much simpler to avail themselves of the privileges afforded by the Society, and will be able to protect themselves both amply and with far less trouble, by making their purchases in accordance with the following directions, and by stipulating that purchases shall be subject to the analysis and report of the Society's Consulting Chemist.

Purchasers are recommended in every case to insist upon having an *Invoice* given to them. This invoice should set out clearly:—

In the case of **Fertilisers**—

- (1.) the **name** of the fertiliser;
- (2.) whether the fertiliser be **artificially compounded** or not;
- (3.) the minimum **analysis** guaranteed in respect of the principal fertilising ingredients.

In the case of **Feeding Stuffs**—

- (1.) the **name** of the article;
- (2.) the **description** of the article: whether it has been made from one substance or seed only, or from more than one.

(NOTE.—The use of the terms "Linsced-cake," "Cotton-cake," &c., implies that these cakes shall be "pure," and purchasers are recommended to insist upon these terms being used without any qualification such as "95 per cent.," "as imported," &c. "Oil-cake" should be avoided. Mixed feeding-cakes and meals should be only purchased with a guaranteed analysis.)

Members of the Society should see that the *Invoices* agree accurately with the orders given by them, and, in giving these orders, they should stipulate that the goods come up to the guarantees set out in the following list, and that they be sold subject to the analysis and report of the Consulting Chemist of the Bath and West and Southern Counties Society.

### FERTILISERS.

**Raw Bones, Bone-meal, or Bone-dust** to be guaranteed "**PURE**," and to contain not less than 45 per cent. of Phosphate of Lime, and not less than 4 per cent. of Ammonia.

**Boiled Bones** to be guaranteed "**PURE**," and to contain not less than 55 per cent. of Phosphate of Lime, and not less than 1 per cent. of Ammonia.

**Mineral Superphosphate of Lime** to be guaranteed to contain a certain percentage of "Soluble Phosphate." [From 25 to 28 per cent. of Soluble Phosphate is an ordinarily good quality.]

**Dissolved Bones** to be guaranteed to be "made from raw bone and acid only," and to be sold as containing stated minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia.

**Compound Artificial Manures, Bone Manures, Bone Compounds, &c.,** to be sold by analysis stating the minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia contained.

**Slag** to be guaranteed to contain a certain percentage of Phosphoric Acid [a good quality contains 15 to 17 per cent. of Phosphoric Acid], and to be sufficiently finely ground that 70 to 90 per cent. passes through a sieve having 100 meshes to the square inch.

**Peruvian Guano** to be described by that name, and to be sold by analysis indicating the minimum percentages of Phosphates and Ammonia.



**Sulphate of Ammonia** to be guaranteed to be "PURE," and to contain not less than 24 per cent. of Ammonia.

**Nitrate of Soda** to be guaranteed to contain 95 per cent. of pure Nitrate of Soda.

**Kainit** to be guaranteed to contain 23 per cent. of Sulphate of Potash.

All Fertilisers to be delivered in good and suitable condition for sowing.

#### FEEDING-STUFFS.

**Linseed Cake, Cotton Cake** (Decorticated and Undecorticated), and **Rape Cake** (for feeding purposes) to be pure, i.e. prepared *only* from the one kind of seed from which their name is derived. The report of the Consulting Chemist of the Bath and West and Southern Counties Society to be conclusive as to the "purity" or otherwise of any feeding-stuffs.

**Mixed Feeding Cakes, Meals, &c.**, to be sold on a guaranteed analysis.

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## INSTRUCTIONS FOR SELECTING AND SENDING SAMPLES FOR ANALYSIS.

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### GENERAL RULES.

1.—A sample taken for analysis should be fairly *representative of the bulk* from which it has been drawn.

2.—The sample should reach the Analyst *in the same condition* as it was at the time when drawn.

### FERTILISERS.

When **Fertilisers** are delivered in bags, select four or five of these from the bulk, and either turn them out on a floor and rapidly mix their contents, or else drive a shovel into each bag and draw out from as near the centre as possible a couple of shovelfuls of the manure, and mix these quickly on a floor.

Halve the heap obtained in either of these ways, take one-half (rejecting the other) and mix again rapidly, flattening down with the shovel any lumps that appear. Repeat this operation until at last only some three or four pounds are left.

From this fill three tins, holding from  $\frac{1}{2}$ -lb. to 1-lb. each, mark, fasten up and seal each of these. Send one for analysis, and retain the others for reference.

Or,—the manure may be put into glass bottles provided with well-fitting corks; the bottles should be labelled and the corks sealed down. The sample sent for analysis can be packed in a wooden box and sent by post or rail.

When manures are delivered in bulk, portions should be successively drawn from *different parts* of the bulk, the heap being turned over now and again. The portions drawn should be thoroughly mixed, sub-divided, and, finally, samples should be taken as before, except that when the manure is coarse and bulky it is advisable to send larger samples than when it is in a finely-divided condition.

### FEEDING-STUFFS.

**Linseed, Cotton, and other Feeding Cakes.**—If a single cake be taken, three strips should be broken off right across the cake and from the middle portion of it, one piece to be sent for analysis, and the other two retained for reference. Each of the three pieces should be marked, wrapped in paper, fastened up and sealed. The piece forwarded for analysis can be sent by post or rail.

A more satisfactory plan is to select four to six cakes from different parts of the delivery, then break off a piece about four inches wide from the middle of

each cake, and pass these pieces through a cake-breaker. The broken cake should then be well mixed, and three samples of about 1 lb. each should be taken and put in tins or bags duly marked, fastened, and sealed as before. One of these lots should be sent for analysis, the remaining two being kept for reference. It is advisable, also, with the broken pieces to send a small strip from an unbroken cake.

**Feeding Meals, Grain, &c.**—Handfuls should be drawn from the centre of half-a-dozen different bags of the delivery; these lots should then be well mixed, and three  $\frac{1}{2}$ -lb. tins or bags filled from the heap, each being marked, fastened up, and sealed. One sample is to be forwarded for analysis and the others retained for reference.

#### SOILS, WATERS, &c.

**Soils.**—Have a wooden box made 6 inches in length and width, and from 9 to 12 inches deep, according to the depth of soil and subsoil of the field. Mark out in the field a space of about 12 inches square; dig round in a slanting direction a trench, so as to leave undisturbed a block of soil and its subsoil 9 to 12 inches deep; trim this block to make it fit into the wooden box, invert the open box over it, press down firmly, then pass a spade under the box and lift it up, gently turn over the box, nail on the lid, and send by rail. The soil will then be received in the position in which it is found in the field.

In the case of very light, sandy, and porous soils, the wooden box may be at once inverted over the soil and forced down by pressure, and then dug out.

**Waters.**—Samples of water are best sent in glass-stoppered Winchester bottles, holding half-a-gallon. One such bottle is sufficient for a single sample. Care should be taken to have these scrupulously clean. In taking a sample of water for analysis it is advisable to reject the first portion drawn or pumped, so as to obtain a sample of the water when in ordinary flow. The bottle should be rinsed out with the water that is to be analysed, and it should be filled nearly to the top. The stopper should be secured with string, or be tied over with linen or soft leather. The sample can then be sent carefully packed either in a wooden box with sawdust, &c., or in a hamper with straw.

**Milk.**—A pint bottle should be sent in a wooden box.

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#### GENERAL INSTRUCTIONS.

**Time for Taking Samples.**—All samples, both of fertilisers and feeding-stuff, should be taken as soon after their delivery as possible, and should reach the Analyst within *ten days* after delivery of the article. In every case it is advisable that the Analyst's certificate be received before a fertiliser is sown or a feeding stuff is given to stock.

**Procedure in the Event of the Vendor wishing Fresh Samples to be Drawn.**—Should a purchaser find that the Analyst's certificate shows a fertiliser or feeding-stuff not to come up to the guarantee given him, he may inform the vendor of the result and complain accordingly. He should then send to the vendor *one* of the two samples which he has kept for reference. If, however, the vendor should demand that a fresh sample be drawn, the purchaser must allow this, and also give the vendor an opportunity of being present, either in person or through a representative whom he may appoint. In that case, three samples should be taken in the presence of both parties with the same precautions as before described, *each* of which should be duly packed up, labelled, and sealed by both parties. One of these is to be given to the vendor, one is to be sent to the Analyst, and the third is to be kept by the purchaser for reference or future analysis if necessary.

All samples intended for the Consulting Chemist of the Society should be addressed (postage or carriage prepaid) to Dr. J. AUGUSTUS VOELCKER, F.R.S., F.I.C., 22, Tudor Street, New Bridge Street, London, E.C. Separate letters of action should be sent at the same time.

**ST. ALBANS MEETING,**

MAY 27, 28, 29, AND 30, AND JUNE 1, 1896.

**MONEY PRIZES.**

|                          | £      | s. | d. | PAGE     |
|--------------------------|--------|----|----|----------|
| HORSES .. .. .           | 644    | 0  | 0  | lxxviii  |
| CATTLE .. .. .           | 1,260  | 10 | 0  | lxxix    |
| SHEEP .. .. .            | 465    | 0  | 0  | lxxxii   |
| PIGS .. .. .             | 260    | 0  | 0  | lxxxiii  |
| CHEESE .. .. .           | 185    | 0  | 0  | lxxxv    |
| BUTTER AND CREAM .. .. . | 75     | 0  | 0  | lxxxv    |
| BUTTER-MAKING .. .. .    | 52     | 10 | 0  | lxxxvi   |
| MILKING .. .. .          | 12     | 0  | 0  | lxxxvii  |
| HORSE-SHOEING .. .. .    | 22     | 0  | 0  | lxxxviii |
| SHEEP-SHEARING .. .. .   | 20     | 0  | 0  | lxxxviii |
| GOATS .. .. .            | 34     | 0  | 0  | xciii    |
| HONEY, &c. .. .. .       | 23     | 17 | 6  | xciii    |
| POULTRY .. .. .          | 188    | 0  | 0  | xcvii    |
| Total .. .. .            | £3,241 | 17 | 6  |          |

**DONORS OF MONEY PRIZES.**

|  | £      | s. | d. |
|--|--------|----|----|
| Bath and West and Southern Counties Society    | 2,952  | 10 | 0  |
| St. Albans Local Committee .. .. .             | 152    | 0  | 0  |
| English Jersey Cattle Society .. .. .          | 40     | 0  | 0  |
| British Goat Society .. .. .                   | 24     | 0  | 0  |
| British Beekeepers' Association .. .. .        | 23     | 17 | 6  |
| English Guernsey Cattle Society .. .. .        | 19     | 0  | 0  |
| Kerry and Dexter Cattle Society .. .. .        | 10     | 10 | 0  |
| Shropshire Sheep Breeders' Association .. .. . | 10     | 0  | 0  |
| Short-Horn Dairy Prize Fund Committee .. .. .  | 10     | 0  | 0  |
|  | £3,241 | 17 | 6  |

**MEDALS AND PLATE.**

In addition to the above Prizes, there are offered:—

A GOLD MEDAL, in the Shire Horse Classes, by the Shire Horse Society.

Two SILVER CUPS, in the Shire Horse Classes, by Sir W. Gilbey, Bart.

A GOLD MEDAL, or BRONZE MEDAL and 5*l.*, in the Hunter Classes, by the Hunters' Improvement Society.

A GOLD, a SILVER, and a BRONZE MEDAL, in the Butter Test Class, by the English Jersey Cattle Society.

A GOLD, a SILVER, and a BRONZE MEDAL, in the Guernsey Butter Test Class, by the English Guernsey Cattle Society.

A GOLD MEDAL in the Suffolk Sheep Classes by the Suffolk Sheep Society.

A GOLD MEDAL and 24 SILVER MEDALS in the Cider Classes, by the Society.

A GOLD, a SILVER, and a BRONZE MEDAL, in the Butter-making Classes, by the Society.

A GOLD MEDAL, for Dairy Appliance, by the Society.

Two SILVER MEDALS in the Goat Classes, by the British Goat Society.

## PRIZES.

| HORSES.   |    | First Prize. | Second Prize. | Third Prize. |
|---|----|--------------|---------------|--------------|
| <i>Unless it is otherwise stated, an Animal cannot be entered in more than one Class.</i>   |    | £            | £             | £            |
| <b>SHIRE.</b>   |    |              |               |              |
| (Eligible for the Shire Horse Society's Stud Book.)   |    |              |               |              |
| CLASS   |    |              |               |              |
| 1.—STALLION, foaled before 1894 . . . . .   | 20 | 10           | 5             |              |
| 2.—STALLION, foaled in 1894 . . . . .   | 15 | 10           | 5             |              |
| 3.—COLT or GELDING, foaled in 1895 . . . . .  | 15 | 10           | 5             |              |
| 4.—MARE and FOAL, or in-Foal . . . . .  | 20 | 10           | 5             |              |
| (The Prizes in Class 5 are offered by the St. Albans Local Committee.)  |    |              |               |              |
| 5.—Mare, foaled before 1893 . . . . .   | 10 | 5            | 3             |              |
| 6.—FILLY, foaled in 1893 . . . . .  | 10 | 5            | 3             |              |
| 7.—FILLY, foaled in 1894 . . . . .  | 10 | 5            | 3             |              |
| 8.—FILLY, foaled in 1895 . . . . .  | 10 | 5            | 3             |              |
| Offered by the Shire Horse Society, for Best MARE or FILLY in Class 4, 5, 6, 7, or 8 (see Special Conditions 35, on page xcii.), a Gold Medal, value £10. |    |              |               |              |
| <b>EXTRA PRIZES.</b>  |    |              |               |              |
| (Offered by Sir Walter Gilbey, Bart.)   |    |              |               |              |
| Best Stallion in the Shire Classes exhibited by a Resident in the County of Hertfordshire, a Silver Cup, value £5.  |    |              |               |              |
| Best Mare ditto ditto value £5.   |    |              |               |              |
| <b>ANY AGRICULTURAL BREED EXCEPT SHIRE.</b>   |    |              |               |              |
| 9.—MARE and FOAL, or in-Foal . . . . .  | 20 | 10           | 5             |              |
| 10.—FILLY, foaled in 1893 . . . . .   | 7  | 4            | 2             |              |
| 11.—FILLY, foaled in 1894 . . . . .   | 7  | 4            | 2             |              |
| 12.—FILLY, foaled in 1895 . . . . .   | 7  | 4            | 2             |              |
| <b>ANY AGRICULTURAL BREED.</b>  |    |              |               |              |
| 1.—GELDING, foaled in 1892 . . . . .  | 7  | 4            | 2             |              |
| 2.—GELDING, foaled in 1893 . . . . .  | 7  | 4            | 2             |              |
| 3.—GELDING, foaled in 1894 . . . . .  | 7  | 4            | 2             |              |
| 4.—MARE, foaled in 1892, to carry not less than 12 stones . . . . .   |    | 20           | 10            | 5            |
| 5.—MARE, foaled in 1893, to carry not less than 12 stones . . . . .   |    | 20           | 10            | 5            |
| 6.—MARE, foaled in 1894, to carry not less than 12 stones . . . . .   |    | 20           | 10            | 5            |
| (The Prizes in Class 6 are offered by the St. Albans Local Committee.)  |    |              |               |              |
| 7.—MARE, foaled in 1892, to carry not less than 12 stones . . . . .   |    | 20           | 10            | 5            |

*Prizes for Cattle, &c., for 1896.*

| HORSES— <i>continued.</i>   |  | First Prize. | Second Prize. |
|---|--|--------------|---------------|
| CLASS   |  | £            | £             |
| 19.—FILLY or GELDING, foaled in 1893 . . . . .  |  | 15           | 10            |
| 20.—FILLY or GELDING, foaled in 1894 . . . . .  |  | 10           | 7             |
| 21.—FILLY, COLT, or GELDING, foaled in 1895 . . . . .   |  | 10           | 7             |
| The HUNTERS' IMPROVEMENT SOCIETY offer a Gold Medal, or a Bronze Medal, and £5, for the best HUNTER BROOD MARE, registered in the Record of Hunter Mares and Sires, in Class 16, in-Foal to, or with Foal at foot by, a Thoroughbred Horse or Registered Hunter Sire, under Conditions 36, stated on p. xcii. |  |              |               |
| HACKNEYS.   |  |              |               |
| (The Prizes in Class 22 are offered by the St. Albans Local Committee.)   |  |              |               |
| 22.—Mare and Foal, or in-Foal . . . . .   |  | 20           | 10            |
| <i>An Animal entered in Class 23, 24, 25, or 26, can also be entered in Class 27, 28, or 29 (see Regulation 8).</i>   |  |              |               |
| 23.—MARE or GELDING, foaled before 1892, over 14 hands . . . . .  |  | 10           | 5             |
| 24.—MARE or GELDING, foaled in 1892 or 1893, over 14 hands . . . . .  |  | 10           | 5             |
| (The Prizes in Class 25 are offered by the St. Albans Local Committee.)   |  |              |               |
| 25.—Mare or Gelding, not over 14 hands . . . . .  |  | 10           | 5             |
| PONIES.   |  |              |               |
| 26.—MARE or GELDING, not over 14·1 hands . . . . .  |  | 10           | 5             |
| HARNESS.  |  |              |               |
| (The Prizes in Class 27 are offered by the St. Albans Local Committee.)   |  |              |               |
| 27.—Mare or Gelding, over 15 hands . . . . .  |  | 10           | 5             |
| 28.—MARE or GELDING, over 14 hands and not over 15 . . . . .  |  | 10           | 5             |
| 29.—MARE or GELDING, over 13 hands and not over 14 . . . . .  |  | 10           | 5             |
| CATTLE.   |  |              |               |
| DEVON.  |  |              |               |
| 30.—BULL, calved in 1892 or 1893 . . . . .  |  | 15           | 10            |
| 31.—BULL, calved in 1894 . . . . .  |  | 15           | 10            |
| 32.—BULL, calved in 1895 . . . . .  |  | 15           | 10            |
| 33.—Cow, in-Milk or in-Calf, calved before 1893 . . . . .   |  | 15           | 10            |
| 34.—HEIFER, in-Milk or in-Calf, calved in 1893 . . . . .  |  | 15           | 10            |
| 35.—HEIFER, calved in 1894 . . . . .  |  | 10           | 5             |
| 36.—HEIFER, calved in 1895 . . . . .  |  | 7            | 5             |

| CATTLE— <i>continued.</i>  |             | First Prize. | Second Prize. | Third Prize. |
|--|-------------|--------------|---------------|--------------|
| CLASS  | SHORT-HORN. | £            | £             | £            |
| 37.—BULL, calved in 1892 or 1893 . . . . .   |             | 15           | 10            | 5            |
| 38.—BULL, calved in 1894 . . . . .   |             | 15           | 10            | 5            |
| 39.—BULL, calved in 1895 . . . . .   |             | 15           | 10            | 3            |
| 40.—Cow, in-Milk or in-Calf, calved before 1893 . . . . .  |             | 15           | 10            | 3            |
| 41.—HEIFER, in-Milk or in-Calf, calved in 1893 . . . . .   |             | 15           | 10            | 3            |
| 42.—HEIFER, calved in 1894 . . . . .   |             | 10           | 5             | 2            |
| 43.—HEIFER, calved in 1895 . . . . .   |             | 7            | 5             | 2            |
| (The First Prize in Class 43a is offered by the Short-Horn Dairy Prize Fund Committee, and the Second Prize by the Bath and West and Southern Counties Society.)   |             |              |               |              |
| (An Animal entered in Class 40 or 41 can be entered also in this Class.)   |             |              |               |              |
| 43a. Pure Short-Horn Cow or Heifer, in-Milk, eligible for Coats's Herd Book, subject to the special Conditions stated below . . . . .  |             | 10           | 5             |              |
| CONDITIONS.  |             |              |               |              |
| a. No previous winner of one of these First Prizes to be eligible to compete.  |             |              |               |              |
| b. The date of last Calving to be stated on the Entry-form.  |             |              |               |              |
| c. The Judges to be specially requested to take into consideration the Milking qualifications of the competing Animals, and in no case to award a Prize to any animal that does not exhibit good Dairy qualities: the object of these Prizes being to encourage the production of the highest type of Short-Horn Dairy Cow, combining good milking properties with robustness of constitution, and at the same time to discourage the exhibition of fat animals. |             |              |               |              |
| HEREFORD.  |             |              |               |              |
| 44.—BULL, calved in 1892 or 1893 . . . . .   |             | 15           | 10            | 5            |
| 45.—BULL, calved in 1894 . . . . .   |             | 15           | 10            | 5            |
| 46.—BULL, calved in 1895 . . . . .   |             | 15           | 10            | 3            |
| 47.—Cow, in-Milk or in-Calf, calved before 1893 . . . . .  |             | 15           | 10            | 3            |
| 48.—HEIFER, in-Milk or in-Calf, calved in 1893 . . . . .   |             | 15           | 10            | 3            |
| 49.—HEIFER, calved in 1894 . . . . .   |             | 10           | 5             | 2            |
| 50.—HEIFER, calved in 1895 . . . . .   |             | 7            | 5             | 2            |
| SUSSEX.  |             |              |               |              |
| 51.—BULL, calved in 1892 or 1893 . . . . .   |             | 15           | 10            | 5            |
| 52.—BULL, calved in 1894 . . . . .   |             | 15           | 10            | 5            |
| 53.—BULL, calved in 1895 . . . . .   |             | 15           | 10            | 3            |
| 54.—Cow, in-Milk or in-Calf, calved before 1893 . . . . .  |             | 15           | 10            | 3            |
| 55.—HEIFER, in-Milk or in-Calf, calved in 1893 . . . . .   |             | 15           | 10            | 3            |
| 56.—HEIFER, calved in 1894 . . . . .   |             | 10           | 5             | 2            |
| 57.—HEIFER, calved in 1895 . . . . .   |             | 7            | 5             | 2            |
| JERSEY.  |             |              |               |              |
| 58.—BULL, calved in 1892 or 1893 . . . . .   |             | 15           | 10            | 5            |
| 59.—BULL, calved in 1894 . . . . .   |             | 15           | 10            | 5            |
| 60.—BULL, calved in 1895 . . . . .   |             | 15           | 10            | 3            |
| 61.—Cow, in-Milk or in-Calf, calved before 1893 . . . . .  |             | 15           | 10            | 3            |
| 62.—HEIFER, in-Milk or in-Calf, calved in 1893 . . . . .   |             | 15           | 10            | 3            |
| 63.—HEIFER, calved in 1894 . . . . .   |             | 10           | 5             | 2            |
| 64.—HEIFER, calved in 1895 . . . . .   |             | 7            | 5             | 2            |

| CATTLE— <i>continued.</i>   |           | First Prize. | Second Prize. | Third Prize. |
|---|-----------|--------------|---------------|--------------|
| SPECIAL PRIZES.   |           | £ s.         | £             | £            |
| (Offered by the English Jersey Cattle Society.)   |           |              |               |              |
| Jersey Bull, under 2 years old, eligible for the English Jersey Cattle Society's Herd Book, exhibited in Class 59 or 60, descended through the Sire or Dam, from a Cow that has won a prize or certificate of merit in the English Jersey Cattle Society's Butter Tests . . . . |           | 5            | 3             | 2            |
| CLASS   | GUERNSEY. |              |               |              |
| 65.—BULL, calved in 1892 or 1893 . . . .  |           | 15           | 10            | 5            |
| 66.—BULL, calved in 1894 . . . .  |           | 15           | 10            | 5            |
| 67.—BULL, calved in 1895 . . . .  |           | 15           | 10            | 3            |
| 68.—Cow, in-Milk or in-Calf, calved before 1893 . . . .   |           | 15           | 10            | 3            |
| 69.—HEIFER, in-Milk or in-Calf, calved in 1893 . . . .  |           | 15           | 10            | 3            |
| 70.—HEIFER, calved in 1894 . . . .  |           | 10           | 5             | 2            |
| 71.—HEIFER, calved in 1895 . . . .  |           | 7            | 5             | 2            |
| SPECIAL PRIZES.   |           |              |               |              |
| (Offered by the English Guernsey Cattle Society.)   |           |              |               |              |
| Best Pair of Guernsey Cows in Class 68 . . . .  |           | 5            |               |              |
| Best Pair of Guernsey Heifers in Class 69, 70, or 71 . . . .  |           | 5            |               |              |
| Cow or Heifer in the Guernsey Classes, eligible for the Guernsey Herd Book, yielding the largest quantity of Butter by the practical Test of the Separator and Churn :—   |           |              |               |              |
| 1st Prize, Gold Medal and . . . .   |           | 3            |               |              |
| 2nd „ Silver Medal and . . . .  |           |              | 3             |              |
| 3rd „ Bronze Medal and . . . .  |           |              |               | 3            |
| ABERDEEN-ANGUS.   |           |              |               |              |
| 72.—BULL, calved in 1893, 1894, or 1895 . . . .   |           | 7            | 5             | 2            |
| 73.—Cow, in-Milk or in-Calf, calved before 1893 . . . .   |           | 7            | 5             | 2            |
| 74.—HEIFER, calved in 1893, 1894, or 1895 . . . .   |           | 7            | 5             | 2            |
| KERRY.  |           |              |               |              |
| 75.—BULL, calved in 1893, 1894, or 1895 . . . .   |           | 7            | 5             | 2            |
| 76.—Cow, in-Milk or in-Calf, calved before 1893 . . . .   |           | 7            | 5             | 2            |
| 77.—HEIFER, calved in 1893, 1894, or 1895 . . . .   |           | 7            | 5             | 2            |
| SPECIAL PRIZE.  |           |              |               |              |
| (Offered by the Kerry and Dexter Cattle Society.)   |           |              |               |              |
| Best Animal in Class 75, 76, or 77, whose Sire and Dam are entered in the Herd Book . . . .   |           | 5 5          |               |              |
| DEXTER KERRY.   |           |              |               |              |
| 8.—BULL, calved in 1893, 1894, or 1895 . . . .  |           | 7            | 5             | 2            |
| 9.—Cow, in-Milk or in-Calf, calved before 1893 . . . .  |           | 7            | 5             | 2            |
| 0.—HEIFER, calved in 1893, 1894, or 1895 . . . .  |           | 7            | 5             | 2            |
| SPECIAL PRIZE.  |           |              |               |              |
| (Offered by the Kerry and Dexter Cattle Society.)   |           |              |               |              |
| Best Animal in Class 78, 79, or 80, whose Sire and Dam are entered in the Herd Book . . . .   |           | 5 5          |               |              |

| CATTLE—continued.   |              |               |              |
|---|--------------|---------------|--------------|
|   | First Prize. | Second Prize. | Third Prize. |
| <b>BUTTER TEST PRIZES.</b>  | £            | £             | £            |
| (Offered by the English Jersey Cattle Society.)   |              |               |              |
| Open to Cows of any Breed or Cross.   |              |               |              |
| (Animals entered in other Classes can also be entered in these Classes.)  |              |               |              |
| CLASS   |              |               |              |
| 81.—Cows under 900 lbs. live weight, yielding the largest quantity of Butter by the practical Test of the Separator and Churn, judged by the scale of points adopted by the English Jersey Cattle Society . . . . . | 10           | 3             | 2            |
| 82.—Cows 900 lbs. live weight and over ditto ditto  | 10           | 3             | 2            |
| Gold, Silver, and Bronze Medals are offered for the 3 Jersey Cows competing in the test, giving the greatest yields of Butter.  |              |               |              |
| <b>S H E E P.</b>   |              |               |              |
| <b>LEICESTER.</b>   |              |               |              |
| 83.—Shearling RAM . . . . .   | 10           | 5             | 2            |
| 84.—Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10           | 5             | 2            |
| 85.—Pen of three Shearling EWES . . . . .   | 10           | 5             | 2            |
| <b>COTSWOLD.</b>  |              |               |              |
| 86.—Shearling RAM . . . . .   | 10           | 5             | 2            |
| 87.—Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10           | 5             | 2            |
| 88.—Pen of three Shearling EWES . . . . .   | 10           | 5             | 2            |
| <b>DEVON LONG-WOOL.</b>   |              |               |              |
| 89.—Shearling RAM . . . . .   | 10           | 5             | 2            |
| 90.—Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10           | 5             | 2            |
| 91.—Pen of three Shearling EWES . . . . .   | 10           | 5             | 2            |
| <b>SOUTHDOWN.</b>   |              |               |              |
| 92.—Shearling RAM . . . . .   | 10           | 5             | 2            |
| 93.—Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10           | 5             | 2            |
| 94.—Pen of three Shearling EWES . . . . .   | 10           | 5             | 2            |
| <b>HAMPSHIRE DOWN.</b>  |              |               |              |
| 95.—Shearling RAM . . . . .   | 10           | 5             | 2            |
| 96.—Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10           | 5             | 2            |
| 97.—Pen of three Shearling EWES . . . . .   | 10           | 5             | 2            |
| <b>SUFFOLK.</b>   |              |               |              |
| 98.—Shearling RAM . . . . .   | 10           | 5             | 2            |
| 99.—Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10           | 5             | 2            |
| 100.—Pen of three Shearling EWES . . . . .  | 10           | 5             | 2            |
| (Offered by the Suffolk Sheep Society.)   |              |               |              |
| Best Exhibit in Class 98, 99, or 100, Gold Medal, value £10.  |              |               |              |



| SHEEP—continued.   |    | First Prize. | Second Prize. | Third Prize. | Fourth Prize. |
|--|----|--------------|---------------|--------------|---------------|
| <b>SHROPSHIRE.</b>   |    | £            | £             | £            | £             |
| —Shearling RAM . . . . .   | 10 | 5            | 3             | 2            |               |
| —Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10 | 5            | 2             |              |               |
| —Pen of three Shearling EWES . . . . .   | 10 | 5            | 3             | 2            |               |
| The 3rd and 4th Prizes in Classes 101 and 103 are offered by the Shropshire Sheep Breeders' Association. |    |              |               |              |               |
| <b>OXFORD DOWN.</b>  |    |              |               |              |               |
| —Shearling RAM . . . . .   | 10 | 5            | 2             |              |               |
| —Pair of RAM LAMBS, dropped in 1896 . . . . .  | 10 | 5            | 2             |              |               |
| —Pen of three Shearling EWES . . . . .   | 10 | 5            | 2             |              |               |
| <b>MERSET AND DORSET HORN.</b>   |    |              |               |              |               |
| —Shearling RAM . . . . .   | 10 | 5            | 2             |              |               |
| —Pair of RAM LAMBS, dropped after Nov. 1st, 1895 . . . . .   | 10 | 5            | 2             |              |               |
| —Pen of three Shearling EWES . . . . .   | 10 | 5            | 2             |              |               |
| <b>P I G S.</b>  |    |              |               |              |               |
| <b>BERKSHIRE.</b>  |    |              |               |              |               |
| —BOAR, farrowed in 1893 or 1894 . . . . .  | 7  | 3            | 2             |              |               |
| —BOAR, farrowed in 1895 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of BOARS, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| —Breeding Sow, farrowed before 1896 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of Breeding Sows, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| <b>LARGE WHITE.</b>  |    |              |               |              |               |
| —BOAR, farrowed in 1893 or 1894 . . . . .  | 7  | 3            | 2             |              |               |
| —BOAR, farrowed in 1895 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of BOARS, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| —Breeding Sow, farrowed before 1896 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of Breeding Sows, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| <b>MIDDLE WHITE.</b>   |    |              |               |              |               |
| —BOAR, farrowed in 1893 or 1894 . . . . .  | 7  | 3            | 2             |              |               |
| —BOAR, farrowed in 1895 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of BOARS, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| —Breeding Sow, farrowed before 1896 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of Breeding Sows, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| <b>ALL WHITE or SMALL BLACK.</b>   |    |              |               |              |               |
| —BOAR, farrowed in 1893 or 1894 . . . . .  | 7  | 3            | 2             |              |               |
| —BOAR, farrowed in 1895 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of BOARS, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |
| —Breeding Sow, farrowed before 1896 . . . . .  | 7  | 3            | 2             |              |               |
| —Pair of Breeding Sows, farrowed in 1896 . . . . .   | 5  | 2            | 1             |              |               |

| PIGS— <i>continued</i> . |   | First Prize. | Second Prize. | Third Prize. |
|--------------------------|---|--------------|---------------|--------------|
| CLASS                    | TAMWORTH.                                     | £            | £             | £            |
| 130.—                    | BOAR, farrowed in 1893 or 1894 . . .          | 7            | 3             | 2            |
| 131.—                    | BOAR, farrowed in 1895 . . .                  | 7            | 3             | 2            |
| 132.—                    | Pair of BOARS, farrowed in 1896 . . .         | 5            | 2             | 1            |
| 133.—                    | Breeding Sow, farrowed before 1896 . . .      | 7            | 3             | 2            |
| 134.—                    | Pair of Breeding Sows, farrowed in 1896 . . . | 5            | 2             | 1            |

## PRODUCE.

### PRIZES FOR CIDER.

First Prize in each Class, a Silver Medal and a Certificate.

Second Prize in each Class, a Bronze Medal and a Certificate.

#### CHAMPION PRIZE.

For Best Exhibit in any of the Classes, a Gold Medal and a Certificate.

The Cider must have been made in 1895, and each Exhibit in Cask must consist of not less than 18 gallons.

#### CLASS Cider made in Devon.

- 135.—Cask of CIDER (*open to LANDOWNERS only*).
- 136.—12 Bottles of CIDER (*open to LANDOWNERS only*).
- 137.—Cask of CIDER (*open to TENANT FARMERS only*).
- 138.—12 Bottles of CIDER (*open to TENANT FARMERS only*).
- 139.—Cask of CIDER (*open to CIDER MERCHANTS only*).
- 140.—12 Bottles of CIDER (*open to CIDER MERCHANTS only*).

#### Cider made in Herefordshire.

- 141.—Cask of CIDER (*open to LANDOWNERS only*).
- 142.—12 Bottles of CIDER (*open to LANDOWNERS only*).
- 143.—Cask of CIDER (*open to TENANT FARMERS only*).
- 144.—12 Bottles of CIDER (*open to TENANT FARMERS only*).
- 145.—Cask of CIDER (*open to CIDER MERCHANTS only*).
- 146.—12 Bottles of CIDER (*open to CIDER MERCHANTS only*).

#### Cider made in Somerset.

- 147.—Cask of CIDER (*open to LANDOWNERS only*).
- 148.—12 Bottles of CIDER (*open to LANDOWNERS only*).
- 149.—Cask of CIDER (*open to TENANT FARMERS only*).
- 150.—12 Bottles of CIDER (*open to TENANT FARMERS only*).
- 151.—Cask of CIDER (*open to CIDER MERCHANTS only*).
- 152.—12 Bottles of CIDER (*open to CIDER MERCHANTS only*).

#### Cider made in Counties other than Devon, Herefordshire, or Somerset.

- 153.—Cask of CIDER (*open to LANDOWNERS only*).
- 154.—12 Bottles of CIDER (*open to LANDOWNERS only*).
- 155.—Cask of CIDER (*open to TENANT FARMERS only*).
- 156.—12 Bottles of CIDER (*open to TENANT FARMERS only*).
- 157.—Cask of CIDER (*open to CIDER MERCHANTS only*).
- 158.—12 Bottles of CIDER (*open to CIDER MERCHANTS only*).

| CHEESE.  | First Prize. | Second Prize. | Third Prize. | Fourth Prize. | Fifth Prize. |
|--|--------------|---------------|--------------|---------------|--------------|
| 2nd Prize in Class 159 is offered by the St. Albans Local Committee.)  | £            | £             | £            | £             | £            |
| -Four CHEESES (the total weight being not less than 224 lbs.), made in 1895 . . . . .  | 20           | 12            | 8            | 6             | 4            |
| -Four CHEESES (the total weight being not less than 112 lbs.), made in 1895 . . . . .  | 12           | 8             | 6            | 4             | 2            |
| -Four Cheddar CHEESES (the total weight being not less than 112 lbs.), made in 1895 by a Student who has received not less than a week's instruction in one of the Society's Cheese Schools . . . . .                              | 10           | 6             | 5            | 3             | 2            |
| -Four CHEESES (the total weight being not less than 112 lbs.), made in 1896 . . . . .  | 10           | 6             | 5            | 3             | 2            |
| -Four Cheddar CHEESES (the total weight being not less than 112 lbs.), made in 1896 by a Student who has received not less than a week's instruction in one of the Society's Cheese Schools . . . . .                              | 8            | 5             | 4            | 2             | 1            |
| -Ten Loaf or other Truckle CHEESES, made in 1896 . . . . .   | 5            | 4             | 3            | 2             | 1            |
| -Four Caerphilly CHEESES, made in 1896 . . . . .   | 3            | 2             | 1            |               |              |
| -Five Cream or other Soft CHEESES . . . . .  | 4            | 3             | 2            | 1             |              |
| <b>BUTTER AND CREAM.</b>   |              |               |              |               |              |
| <i>These Classes are not open to Professional Teachers.)</i>   |              |               |              |               |              |
| -3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made of cream from Cows other than Channel Island Breeds . . . . .  | 5            | 3             | 2            | 1             |              |
| -3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made of cream from Cows of Channel Island Breeds only . . . . .   | 5            | 3             | 2            | 1             |              |
| -3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made by a Student who has attended a course of instruction at any Butter School conducted by the Society or by a County Council . . . . . | 5            | 3             | 2            | 1             |              |

| BUTTER AND CREAM— <i>contd.</i>   |  |  |  |  | First<br>Prize. | Second<br>Prize. | Third<br>Prize. | Fourth<br>Prize. | Fifth<br>Prize. |
|---|--|--|--|--|-----------------|------------------|-----------------|------------------|-----------------|
| <b>CLASS</b>  |  |  |  |  |                 |                  |                 |                  |                 |
| 170.—3 lbs. of Fresh (or very slightly salted) BUTTER, in pound plain rolls or brick-shapes, made from scalded cream  |  |  |  |  | £               | £                | £               | £                | £ s.            |
| 171.—3 lbs. of BUTTER, to which no salt whatever has been added, in pound plain rolls or brick-shapes   |  |  |  |  | 5               | 3                | 2               | 1                |                 |
| <b>SPECIAL PRIZES.</b>  |  |  |  |  |                 |                  |                 |                  |                 |
| Three Prizes of £1 each will be given for BUTTER, which has the best keeping qualities, exhibited in Class 167, 168, 169, 170, or 171. 1 lb. will be taken on the first day of the Show from each Prize lot of Butter in the Classes named, and will be judged on the last day of the Show. |  |  |  |  | 1<br>1<br>1     |                  |                 |                  |                 |
| 172.—12 lbs. of Salted BUTTER, in a jar or crock, to be delivered, to the Secretary, care of Mr. H. Gibson, Bleak House, St. Albans, four weeks before the Show   |  |  |  |  | 5               | 3                | 2               | 1                |                 |
| (The Prizes in Class 173 are offered by the St. Albans Local Committee.)  |  |  |  |  |                 |                  |                 |                  |                 |
| 173.—Four half-pounds of Clotted or Devonshire Cream, packed either in tins or earthen jars   |  |  |  |  | 3               | 2                | 1               |                  |                 |
| <b>BUTTER-MAKING.</b>   |  |  |  |  |                 |                  |                 |                  |                 |
| <i>Professional Teachers, Makers or Vendors of Churns, or persons in any way representing the interests of Makers or Vendors of Churns, are not eligible to compete in the Butter-Making Classes; and this Regulation will be strictly enforced.</i>  |  |  |  |  |                 |                  |                 |                  |                 |
| <i>A previous winner of the Society's Champion Gold Medal is not eligible to compete in any of the Butter-Making Classes.</i>   |  |  |  |  |                 |                  |                 |                  |                 |
| <i>These Prizes will be awarded for the best and largest quantity of Butter made from a given quantity of Cream in the easiest and most approved method.</i>  |  |  |  |  |                 |                  |                 |                  |                 |
| <i>Prizes in Classes 174 and 175 are offered by the St. Albans Local Committee.)</i>  |  |  |  |  |                 |                  |                 |                  |                 |
| <i>On the 1st day of the Show, open to Students who have attended a course of instruction at any Butter School conducted by the Society or by the Local Council</i>   |  |  |  |  | 5               | 3                | 2               | 1                | 0 10            |

**BUTTER-MAKING—continued.**

**AGGS**

|  | First<br>Prize. | Second<br>Prize. | Third<br>Prize. | Fourth<br>Prize. | Fifth<br>Prize. |
|--|-----------------|------------------|-----------------|------------------|-----------------|
| 5.—On the 2nd day of the Show, open to any woman . . . . .   | £ s. 5 0        | £ s. 3 0         | £ s. 2 0        | £ s. 1 0.        | £ s. 0 10       |
| 6.—On the 3rd day of the Show, open to any man or woman, except the Winner of the 1st Prize in Class 175 . . . . .         | 5. 0            | 3 0              | 2 0             | 1 0              | 0 10            |
| 7.—On the 4th day of the Show, open to any man or woman, except the Winners of 1st Prizes in Classes 175 and 176 . . . . . | 5 0             | 3 0              | 2 0             | 1 0              | 0 10            |
| 78.—On the 5th day of the Show, open to any dairymaid working for wages not exceeding £20 a year                           | 3 0             | 2 0              | 1 0             | 0 10.            |                 |

**CHAMPION PRIZES.**

On the 5th day of the Show the Winners of Prizes in Classes 174, 175, 176, 177, and 178 will compete for:—

1st Prize—A Gold Medal, and the Society's Certificate.

2nd Prize—A Silver Medal, and the Society's Certificate.

3rd Prize—A Bronze Medal, and the Society's Certificate.

**MILKING.**

|  |      |      |      |      |
|--|------|------|------|------|
| 79.—For Competitors 20 years of age and over . . . . . | 1 10 | 1 0  | 0 15 | 0 10 |
| 80.—For Women . . . . .                                | 1 10 | 1 0  | 0 15 | 0 10 |
| 81.—For Competitors under 20 years of age . . . . .    | 1 0  | 0 15 | 0 10 | 0 5  |

**CHAMPION PRIZE.**

(Offered by the St. Albans Local Committee.)

For the best Competitor in Class 179, 180, or 181 . . . . .

2 0

**DAIRY APPLIANCE.**

82.—A Gold Medal is offered for the best Acidimeter.

The following will be regarded as essential points in deciding upon the merits of the exhibits in Class 182: efficiency; simplicity of construction; adaptability to the testing of milk and milk products; and economy in cost.

| HORSE-SHOEING.  |  | First Prize. | Second Prize. | Third Prize. | Fourth Prize. |
|---|--|--------------|---------------|--------------|---------------|
| CLASS   |  | £            | £             | £ s.         | £ s.          |
| 183.—Best Shoeing of a NAG HORSE by a Smith on the 3rd day of the Show . . .  |  | 5            | 3             | 2 0          | 1 0           |
| 184.—Best Shoeing of a CART HORSE by a Smith on the 4th day of the Show . . .   |  | 5            | 3             | 2 0          | 1 0           |
| <p>The Registration Committee of the Farriers' Company will admit all the Winners of First Prizes in these Competitions to the Official Register <i>free of charge</i>, on their satisfying the Judges that they have a fair knowledge of the structure of the horse's foot, and on the necessary application being made to the Company in the prescribed form.</p> |  |              |               |              |               |
| SHEEP-SHEARING.   |  |              |               |              |               |
| 185.—Best Shearing of Two SHEEP on the 5th day of the Show by Competitors under 16 years of age . . . . .   |  | 2            | 1             | 0 10         |               |
| 186.—Best Shearing of Two SHEEP on the 5th day of the Show by Competitors of 16 and under 20 years of age . . .   |  | 3            | 2             | 1 0          | 0 10          |
| 187.—Best Shearing of Two SHEEP on the 5th day of the Show by Competitors 20 years of age and over . . . . .  |  | 4            | 3             | 2 0          | 1 0           |

## CONDITIONS AND REGULATIONS.

### GENERAL.

#### ENTRIES.

1. The following are the Entry Fees, which must be paid when the Entries are made.

|   |                | Members.  | Non-Members. |
|---|----------------|-----------|--------------|
| Horses (including Horse Box) .. ..      | for each Entry | 10s.      | .. 20s.      |
| Cattle, Sheep, and Pigs .. ..           | do.            | 5s.       | .. 15s.      |
| Butter Test Prizes .. ..                | do.            | 21s.      | .. 21s.      |
| Cheese, Class 159 .. ..                 | do.            | 10s.      | .. 20s.      |
| Do. Classes 160, 162, 164, 165, and 166 | do.            | 5s.       | .. 10s.      |
| Do. Classes 161 and 163 .. ..           | do.            | 5s.       | .. 5s.       |
| Cider, Butter, and Cream .. ..          | do.            | } 2s. 6d. | .. 5s.       |
| Butter-making Classes 174 to 177        | do.            |           |              |
| Horse-Shoeing and Sheep-Shearing ..     | do.            |           |              |
| Milking .. ..                           | do.            | 2s. 6d.   | .. 2s. 6d.   |
| Butter-Making, Class 178 .. ..          | do.            | 2s. 6d.   | .. 2s. 6d.   |
| Dairy Appliances .. ..                  | do.            | 5s.       | .. 15s.      |

2. No Exhibitor can make more than three entries in any one Class of Horses, Cattle, Sheep or Pigs. (See Regulation 55 as to Dairy Produce.)

3. Entries should reach the Secretary on or before April 8; after that date and up to April 15, Entries will only be received *on payment of double fees* in each case.

4. The privilege of entering at Members' Fees is limited to Members of the Society elected on or before January 28, 1896, and subscribing not less than 1*l.* annually.

5. Where a Prize is offered for a *pair* or *pen* of Animals, Single Entry-fees only are payable for each *pair* or *pen*, and only one Entry-form must be used.

6. All Entries must be made on the printed forms to be obtained of the Secretary (THOS. F. FLOWMAN, 4, Terrace Walk, Bath), and, in applying for Forms, Exhibitors are requested to state how many Entries they wish to make of either Horses, Cattle, Sheep, Pigs, &c., as each Stock Entry must be made on a separate Form.

7. All Entry-forms must be signed by the Exhibitor or his Agent. Exhibitors are requested to carefully examine the List of Prizes and Conditions, as the Society cannot be responsible for any errors made by Exhibitors in their Entry-forms. An Exhibitor omitting to give information asked for on the Entry-form, with regard to the age, name, colour, sire, dam, &c., of an Animal, will be liable to have his Entry disqualified.

8. An Animal entered in Class 23, 24, 25, or 26, can also be entered in Class 27, 28, or 29, provided notice is given on the Entry-form and a second Entry-fee of 10*s.* for Members and 1*l.* for non-Members be paid. Except in these and the Butter-Test Classes an Animal or Article cannot be entered in more than one Class.

9. All Animals or Articles exhibited must be *bonâ fide* the property of the Exhibitor at and from the time of Entry.

#### SHOWYARD.

10. The Yard will be open for the reception of Horses, Cattle, Sheep, and Pigs, on Monday and Tuesday, May 25 and 26, from 7 A.M. to 6 P.M. Horses will also be received from 6 to 8 o'clock on the morning of the first

day of Show, but all other Stock Entries must be in the Yard the previous day. (See Regulations 52 and 53 for Dairy Produce.) Labels will be sent by the Secretary, and must be securely affixed to the head of each Animal, or, in the case of other Exhibits, to the receptacle containing them.

11. All Exhibits and all persons in charge of the same, will be subject to the Orders, Regulations, and Rules of the Society.

12. All Exhibits, except Horses (see Conditions 29 and 30), must remain in the place allotted to them in the Showyard until 6 P.M. on the last day of the Show.

13. No Animal can be permitted to be removed from its place without leave from the Steward of the Department.

14. The Society, its Officers, and Servants, will not be liable for any errors or mistakes that may happen in placing or penning the Stock or Articles to be exhibited, but the Servants in charge of the same must see that they are placed or penned according to their Entries.

15. All Servants in charge of Stock must be in attendance each day during the Show at least a quarter of an hour before the time appointed for parading the Animals in the Show-rings, and must take their Animals into the ring when desired by the Stewards. Any infringement of this or any other rule, or neglecting to obey the orders of the Stewards, will render the Exhibitor liable to a fine of 1*l.*, and to the forfeiture of any Prize he may be entitled to.

16. The Society will not, in any case, or under any circumstances, hold itself responsible for any loss, damage, misdelivery, illness or accident that may occur *through or to* any Exhibit; and it shall be a condition of entry that each Exhibitor shall hold the Society harmless, and indemnify it against any legal proceedings arising from any of the above-named circumstances.

17. Hay, straw, and green food will be delivered to the Servants of Exhibitors free of expense at the Forage Stores in the Showyard, and they must take it to their respective Animals. Servants must apply at the Forage Stores for their Forage Tickets after they have brought their Animals into the Yard.

NOTE.—For the convenience of Exhibitors wishing to sell their Animals, a Register will be kept at the Secretary's Office, in which they may enter the prices.

#### DISQUALIFICATIONS.

18. No Animal which has been exhibited as Fat Stock at any Show shall be eligible to compete for the Prizes offered in this Prize Sheet.

19. No Animal which has taken a First Prize at any Meeting of this Society can compete again in the corresponding Class.

20. An Animal having any unsoundness likely to be transmitted to its progeny, shall be disqualified thereby from receiving any Prize offered by or through the Society.

21. If any wilful mis-statement, or misrepresentation, be proved to have been made by an Exhibitor, either in an Entry-form or otherwise, in connection with this or any Agricultural Society, the Council shall have power to withhold any Prize awarded to him, and to disqualify him from exhibiting at the Society's future Shows. (See also Regulation 7.)

#### UNNECESSARY CAUSES.

22. Any person who enters an Animal for the Show causes unnecessary expences and capous, and disarranges the Showyard, any person who enters stock, and failing to exhibit the same shall pay a penalty of 10*s.* for each Entry, unless a Certificate, under the hand of the Exhibitor or his agent, be lodged with the Secretary of the Society, before the day



Exhibition, certifying that such non-exhibition is caused either by— (1) the death of the animal or animals; or (2) contagious or infectious case (confirmed by the explanatory Certificate of a Veterinary Surgeon); (3) by its becoming ineligible for the Class in which it has been entered. Such fines to be recoverable as debts to the Society, and, until payment, to bar all persons owing them from exhibiting at any future meeting of the Society.

23. Every Exhibitor will be required to undertake to forfeit and pay to the Society the sum of 20*l.*, as and for liquidated damages, if any Animal which exhibits be to his knowledge suffering from any contagious or infectious disease, and the Stewards are empowered to prevent the entry of any diseased Animal into the Yard, or to have it removed therefrom, if they should consider it desirable.

24. Stock Exhibitors will receive Admission Tickets for the Show for themselves and the Servants required to take charge of their Animals, and Exhibitors will be held responsible for their proper use. If a Ticket is transferred or otherwise improperly used it will be cancelled, and the Exhibitor will be required to pay a fine of 1*l.* Servants in charge of Stock at night must, if they leave the Yard, return before 10 P.M., or they will not be admitted.

#### AWARDS.

25. The Society reserves to itself the right to withhold any Prize, if, in the opinion of the Stewards, the conditions and regulations have not been properly complied with.

26. Except under a special recommendation from the Judges, no Second Prize will be given in any of the Classes unless there are three Entries, and no Third Prize unless there are six Entries. No Prize additional to those advertised by the Society will be given in any Class, except on the written recommendation of the Judges (which shall state the special reasons for the prize) and the Steward of the Class.

27. The Certificate of the Veterinary Inspector, whether as to age or soundness, shall be required only in cases where the Judges are in doubt, or where the Stewards may consider it necessary. The decision of the Inspector in such cases shall be final and conclusive; and in case it shall be against the Animal to which a Prize has been awarded, such Animal shall be disqualified from receiving such Prize.

#### PROTESTS.

28. Any protest must be lodged with the Secretary in the handwriting of the Exhibitor, or that of his representative, before 6 P.M. on the first day of the Exhibition, and no protest will be accepted without a deposit of 3*l.*, which sum will be forfeited at the discretion of the Stewards unless the protest is substantiated. Protests will be considered by the Disqualifying Committee, whose decision shall be final and conclusive.

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#### APPLYING TO CERTAIN CLASSES ONLY.

##### HORSES.

29. Horses can be removed from the Yard at night on deposit by the Exhibitor of 3*l.* at the Finance Office, which sum will be forfeited if the horse does not return at 8 A.M. each day during the Exhibition.

30. The Stallions in Classes 1 and 2 are not required to remain in the Yard longer than 6 o'clock in the evening of the third day of the Show.

31. Exhibitors must provide saddles for Horses in Classes 17, 18, 23, 24, 25, and 26, as they are to be ridden; and vehicles and harness for those in Classes 27, 28, and 29, which are to be driven.

32. No Horse, unless a Foal, will be admitted into the ring without a proper bit.

33. The Prizes for Stallions in Class 1 will be withheld until a Certificate from the owner is delivered to the Secretary that the Horse has served at least 20 Mares during the current season.

34. In Classes 4, 9, 16, and 22, Mares shall be exhibited with their own foals at foot, or shall hereafter be certified to have produced a living Foal before the 1st of August of the year of the Show.

35. The following special conditions apply only to the Prize offered by the Shire Horse Society, viz.: the owner of the animal entered to have been a Member of the Bath and West and Southern Counties Society for not less than 6 months previous to April 15, 1896; a Mare six years old, or upwards, to have had a living foal; no animal to compete which has won the Shire Horse Society's Gold Medal during the current year, the Royal and London Shows being excepted; the winning animal to be entered, or eligible for entry, in the Shire Horse Society's Stud Book; and a Certificate that she is free from hereditary disease to be lodged with the Secretary of the Shire Horse Society, the Veterinary examination to be made on the ground by the Veterinary Inspector appointed for the Show.

36. The following special conditions apply only to the Prize offered by the Hunters' Improvement Society, viz.:—(1.) "The Mare awarded the Medal must be registered in the Hunters' Improvement Society's Record of Mares and Sires, or an entry made with their Secretary for Volume VII, the Award being withheld till this is done. (2.) A Certificate that the Mare is free from hereditary disease must be lodged with the Secretary of the Hunters' Improvement Society before the Award will be confirmed. (3.) Mares which have previously been awarded the Society's Medal, and Mares which have previously won Hunters' Improvement Society's Premiums as Brood Mares, shall be ineligible for this Medal. (4.) In the event of the Medal being awarded to a Mare entered as 'in-foal to a Thoroughbred Horse or Registered Hunter Sire,' the Hunters' Improvement Society will not forward the Medal till a Certificate of foaling has been lodged with their Secretary. (5.) If any of the Prize Mares are disqualified owing to their previous win of the Hunters' Improvement Society's Medal or Premiums, it shall then be awarded to the next in order of award, provided she takes one of the Prizes or the First Reserve."

#### CATTLE.

37. All Bulls must have a ring or clamp attached to the nose, and in the aged Classes must be provided with a strong chain, and be led with a proper stick. All cattle must be properly secured to the satisfaction of the Officers of the Society, on being brought to the gate of the Yard, or they will not be admitted.

38. All Cattle will be required to be paraded in the ring at least once a day at the discretion of the Stewards.

39. No Bull above 2 years old will be eligible to receive a Prize until certified to have served not less than six different Cows (or Heifers), previous to June 1st, 1896, and it must be the sire of live calves dropped in the year 1896.

40. No Cow will be eligible to receive a Prize until certified to have had a living Calf within the twelve months preceding the date of Show, or that the Calf, if dead, was born at the proper time.

41. In the Classes for Heifers "in-Milk or in-Calf," no Heifer entered as in-Calf will be eligible to receive a Prize until certified to have produced a living Calf before January 1, 1897, or that the Calf, if dead, was born at full time before that date.

42. Every Cow or Heifer in-Milk shall be milked dry in the Showyard at 6 P.M. on the evening preceding the day of judging, in the presence of an officer of the Society appointed for the purpose.

43. Any Animal in the Cattle Classes found to be artificially coloured will be disqualified.

44. Any person selling Milk in the Yard, except in the place appointed by the Stewards, will be fined 5s. for each infringement of this Regulation.

#### **SHEEP.**

45. All Sheep (with the exception of the Welsh Mountain Breed) over one year old must have been really and fairly shorn bare on or after the 1st of April, 1896. If the Judges consider that a Sheep has not been shorn bare they will report this to the Stewards, with a view to its disqualification.

46. Each pen of Ewes must be of the same Flock. No Exhibitor shall enter in the Leicester and any other Long-wool Classes from the same Flock.

#### **PIGS.**

47. The Pair of Pigs in each pen must be of the same litter.

48. All Sows farrowed before 1896 shall be certified to have had a litter of live Pigs within six months preceding the first day of exhibition, or to be in-Pig at the time of entering, so as to produce a litter of Pigs, farrowed at their proper time, before the 1st of September following. In the case of in-Pig Sows the Prize will be withheld until the Exhibitor shall have furnished the Secretary with a certificate of farrowing as above.

49. All Pigs exhibited with a Sow shall be her own produce, of the same litter, and not exceeding two months old at the time of the Show.

50. No Sow above 18 months old that has not produced a litter of live Pigs shall be eligible to compete in any of the Classes.

51. Any animal in the Pig Classes found to be artificially coloured will be disqualified.

#### **CIDER.**

*See Entry-Form for Conditions and Regulations.*

#### **GOATS.**

*See Entry-Form for particulars.*

#### **HONEY AND HIVES.**

*See Entry-Form for particulars.*

#### **CHEESE, BUTTER, AND CREAM.**

52. Cheese will be received in the Yard on Monday, May 25, from 7 A.M. to 6 P.M., and on Tuesday, May 26, from 7 to 10 A.M. All Cheese must be in its proper place in the Showyard by 10 o'clock on Tuesday morning, May 26, as the judging of Cheese will take place on that day.

53. Butter (except in Class 172) and Cream will be received in the Yard on Monday and Tuesday, May 25 and 26, from 7 A.M. to 6 P.M., and from 6 to 8 A.M., on Wednesday, May 27. The Butter in Class 172 must

delivered to the Society's Secretary, care of Mr. H. Gibson, Black Horse St. Albans, on or before April 29.

54. Professional Teachers are not eligible to compete in the Classes of Butter.

55. No Exhibitor shall make more than two Entries in any one class of Cheese, or more than one Entry in any one class of Butter or Cream.

56. The Cheese, Butter, or Cream must (except in the Students' Class) have been made in the Exhibitor's own Dairy by himself, his family, or his servants. In the Students' Classes the Cheese or Butter must have been made by the Student.

57. Any Cheese bled or marked will be disqualified. Any distinct mark on the Butter or its cloth, or on the jars containing the Cream, will disqualify.

58. The winners of First Prizes in the Cheese Classes will have to give their Cheese (which the Judges will select) to the Council for public disposal. The First Prize lots of Butter and Cream will be the property of the Council for public disposal. Other Exhibitors of Butter and Cream will have to give their Cheese from each Exhibit for public tasting; and endeavour will be made to prevent damage to the Exhibits then remaining.

59. Exhibitors must very carefully answer the questions on the Entry-form.  
60. Exhibitors must make their own arrangements for the return of their Exhibits, as the Society cannot undertake this.

#### BUTTER-MAKING COMPETITIONS.

61. Cream will be supplied free of charge, and the Butter will be the property of the Society.

62. The Society will supply Competitors with churns, &c., or they may bring their own appliances if they prefer to do so.

63. Competitors who work the Butter with their hands will be disqualified.

64. Professional Teachers, Makers or Vendors of Churns, or persons in any way representing the interests of Makers or Vendors of Churns, are not eligible to compete for any Prize given in the Butter-Making Competition in the Showyard, nor are previous winners of the Society's Champion Gold Medal.

65. Competitors must attend at the Working Dairy *one hour* before the time stated on the Programme for the commencement of each Competition.

#### HORSE-SHOEING COMPETITIONS.

66. Competitors must attend at the Shoeing Ring in the Showyard 10 o'clock on the day of Competition.

67. Each Competitor must make and fix a fore-shoe, and make but one fix, a hind-shoe, in the Showyard, having previously taken off the old fore-shoe.

68. A Competitor must bring his own Tools, Nails, and a Striker, and must not be a Competitor or a qualified smith, but the Society will provide forges, anvils, flat iron, and fuel.

69. All fore-shoes for Nag Horses must be fullered.

70. No Man who has already won a First Prize given by the Society in Horse-Shoeing will be eligible to compete again in the same class.

#### SHEEP-SHEARING COMPETITIONS.

71. Competitors must attend at the Shearing Ring in the Showyard 11 o'clock on the day of Competition.

72. Competitors must provide their own tools.

73. No man who has already won a First Prize given by the Society for Sheep-Shearing will be eligible to compete again in the same class.

#### **MILKING COMPETITION.**

*See Entry-Form for Conditions and Regulations.*

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### **ADJUDICATION OF PRIZES.**

74. By the Bye-Laws of the Society the Judges are instructed as follows, and Entries are received subject to this :—

a. Not to award any Prize or Commendation unless the Entry possesses sufficient merit.

b. Not to award a Prize to any Horse or Mare unless it is free from unsoundness likely to be transmitted to its progeny ; or if a Gelding, unless free from unsoundness ; in either case, an accident having temporary consequences only excepted.

c. In awarding Prizes to Cattle, Sheep, and Pigs, to decide according to the relative merits of the Animals for Breeding purposes, and not to take into consideration their present value to the butcher.

d. To draw the attention of the Stewards to any Exhibit that has been improperly prepared for Exhibition or is wrongly entered.

e. To record the number of the Entries which may in their opinion possess sufficient merit to succeed to vacancies caused by disqualification. Entries so placed in a Reserved List shall, in the event of any case of disqualification, succeed to the Prize or Prizes according to the Judges' Award.

f. To deliver to the Stewards of the respective departments their Awards signed, stating the numbers to which the Prizes are adjudged and the Reserve Numbers, immediately after they have completed their adjudication upon any Class.

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Should any question arise upon which the Judges may desire a further opinion, the Stewards shall provide them with a Referee.

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### **PAYMENT OF PRIZES.**

75. Cheques for the Prizes awarded (except where further qualification of an animal is required) will be drawn at the meeting of the Finance Committee held in July, 1896, and will then be forwarded by post to the Exhibitors to whom they have been awarded.

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### **RAILWAY ARRANGEMENTS.**

The Railway Companies agree to the following arrangements for the CONVEYANCE OF STOCK to and from the Show :—

1. Stock to be charged full rates to the Show, but half rates on the return journey at owner's risk if unsold, and on production of a Certificate to that effect from the Exhibitor. The reduction to half rate is allowed only when the Stock is returned to the same Station as that from which it was conveyed to the Show and by the same route.

2. Men certified by the Exhibitor to be *bonâ fide* in Charge of Stock to be conveyed free, provided that they travel in charge of the Animals and in the same train as the Animals; the number of men not to exceed one man to each vehicle.

3. The foregoing regulations to apply to Animals whether carried in horse boxes by passenger or special train, or in cattle trucks by luggage trains. The concession as to Animals in horse boxes is granted only on the condition that the present orders of the Board of Agriculture, under which the Companies are not required to disinfect horse boxes, remain in force. If the unsold Stock, which was conveyed on the Outward Journey by Goods Train in Cattle Trucks, be returned by Passenger Train in Horse Boxes, at owner's risk, half the Passenger rates will be charged, and *vice versâ*.

4. The Railway Companies will provide specially constructed covered Cattle Trucks at a reduced rate of charge, further proportionate reduction being made when more than one Animal is carried.

To insure prompt delivery of Stock, Exhibitors are recommended to ascertain the *proper time for loading* from the Superintendent or Booking Clerk at the Station from which their Stock is intended to be despatched.

*Telegraphic Address*—"PLOWMAN," BATH.

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## ST. ALBANS MEETING,

MAY 27, 28, 29, 30, AND JUNE 1, 1896.

## PRIZES FOR POULTRY.

| CLASS  | First Prize. | Second Prize. | Third Prize. |
|--|--------------|---------------|--------------|
|  | £ s.         | s. d.         | s. d.        |
| 1.—COCHINS (Cinnamon and Buff)—Cock . . . . .            | 1 10         | 15 0          | 5 0          |
| 2.—Ditto—Hen . . . . .                                   | 1 10         | 15 0          | 5 0          |
| 3.—COCHINS (Partridge-Feathered or White)—Cock . . . . . | 1 10         | 15 0          | 5 0          |
| 4.—Ditto—Hen . . . . .                                   | 1 10         | 15 0          | 5 0          |
| 5.—BRAHMAS (Dark)—Cock . . . . .                         | 1 10         | 15 0          | 5 0          |
| 6.—Ditto—Hen . . . . .                                   | 1 10         | 15 0          | 5 0          |
| 7.—BRAHMAS (Light)—Cock . . . . .                        | 1 10         | 15 0          | 5 0          |
| 8.—Ditto—Hen . . . . .                                   | 1 10         | 15 0          | 5 0          |
| 9.—LANGSHANS—Cock . . . . .                              | 1 10         | 15 0          | 5 0          |
| 10.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 11.—PLYMOUTH ROCKS—Cock . . . . .                        | 1 10         | 15 0          | 5 0          |
| 12.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 13.—WYANDOTTES—Cock . . . . .                            | 1 10         | 15 0          | 5 0          |
| 14.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 15.—ORPINGTONS—Cock . . . . .                            | 1 10         | 15 0          | 5 0          |
| 16.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 17.—SPANISH—Cock . . . . .                               | 1 10         | 15 0          | 5 0          |
| 18.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 19.—MINORCAS—Cock . . . . .                              | 1 10         | 15 0          | 5 0          |
| 20.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 21.—LEGHORNS (any Variety)—Cock . . . . .                | 1 10         | 15 0          | 5 0          |
| 22.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 23.—HAMBURGS (Gold or Silver Spangled)—Cock . . . . .    | 1 10         | 15 0          | 5 0          |
| 24.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 25.—HAMBURGS (Gold or Silver Pencilled)—Cock . . . . .   | 1 10         | 15 0          | 5 0          |
| 26.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 27.—HAMBURGS (Black)—Cock . . . . .                      | 1 10         | 15 0          | 5 0          |
| 28.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 29.—DORKINGS (Coloured)—Cock . . . . .                   | 1 10         | 15 0          | 5 0          |
| 30.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 31.—DORKINGS (Silver Grey)—Cock . . . . .                | 1 10         | 15 0          | 5 0          |
| 32.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 33.—DORKINGS (White or Cuckoo)—Cock . . . . .            | 1 10         | 15 0          | 5 0          |
| 34.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 35.—GAME (Black-Breasted Reds)—Cock . . . . .            | 1 10         | 15 0          | 5 0          |
| 36.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 37.—GAME (Brown-Breasted Reds)—Cock . . . . .            | 1 10         | 15 0          | 5 0          |
| 38.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 39.—GAME (Pile or any other Variety)—Cock . . . . .      | 1 10         | 15 0          | 5 0          |
| 40.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 41.—GAME (Old English)—Cock . . . . .                    | 1 10         | 15 0          | 5 0          |
| 42.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |
| 43.—INDIAN GAME—Cock . . . . .                           | 1 10         | 15 0          | 5 0          |
| 44.—Ditto—Hen . . . . .                                  | 1 10         | 15 0          | 5 0          |

| CLASS   | First Prize. | Second Prize. | Third Prize. |
|---|--------------|---------------|--------------|
|   | £ s.         | s. d.         | s. d.        |
| 45.—MALAYS—Cock . . . . .   | 1 10         | 15 0          | 5 0          |
| 46.—Ditto—Hen . . . . .   | 1 10         | 15 0          | 5 0          |
| 47.—FRENCH FOWL (Houdan, Crève, La Flèche, or any other Breed)—Cock . . . . .           | 1 10         | 15 0          | 5 0          |
| 48.—Ditto—Hen . . . . .   | 1 10         | 15 0          | 5 0          |
| 49.—ANY OTHER DISTINCT VARIETY (not previously mentioned)—Cock . . . . .                | 1 10         | 15 0          | 5 0          |
| 50.—Ditto—Hen . . . . .   | 1 10         | 15 0          | 5 0          |
| <b>CHICKENS OF 1896.</b>  |              |               |              |
| 51.—Cochin, Brahma, Langshan, Plymouth Rock, Wyandotte, or Orpington—Cockerel . . . . . | 1 10         | 15 0          | 5 0          |
| 52.—Ditto—Pullet . . . . .  | 1 10         | 15 0          | 5 0          |
| 53.—Spanish, Minorca, Leghorn, Hamburg, or French Fowl—Cockerel . . . . .               | 1 10         | 15 0          | 5 0          |
| 54.—Ditto—Pullet . . . . .  | 1 10         | 15 0          | 5 0          |
| 55.—Dorking, Game, Malay, or any other Variety—Cockerel . . . . .                       | 1 10         | 15 0          | 5 0          |
| 56.—Ditto—Pullet . . . . .  | 1 10         | 15 0          | 5 0          |
| <b>CHICKENS OF 1896 FOR TABLE.</b>  |              |               |              |
| 57.—ANY PURE BREED—Two Cockerels . . . . .  | 1 10         | 15 0          | 5 0          |
| 58.—Ditto—Two Pullets . . . . .   | 1 10         | 15 0          | 5 0          |
| 59.—CROSS BREEDS (Dorking and Indian, or Old English Game)—Two Cockerels . . . . .      | 1 10         | 15 0          | 5 0          |
| 60.—Ditto—Two Pullets . . . . .   | 1 10         | 15 0          | 5 0          |
| 61.—ANY OTHER DISTINCT CROSS (breeds to be named)—Two Cockerels . . . . .               | 1 10         | 15 0          | 5 0          |
| 62.—Ditto—Two Pullets . . . . .   | 1 10         | 15 0          | 5 0          |
| <b>SELLING CLASSES.</b>   |              |               |              |
| 63.—ANY DISTINCT BREED—Cock ( <i>price not to exceed</i> 1l. 1s.) . . . . .             | 1 10         | 15 0          | 5 0          |
| 64.—ANY DISTINCT BREED—Hen ( <i>price not to exceed</i> 1l. 1s.) . . . . .              | 1 10         | 15 0          | 5 0          |
| <b>BANTAMS.</b>   |              |               |              |
| 65.—BANTAMS (Black or White)—Cock . . . . .   | 1 0          | 10 0          | 5 0          |
| 66.—Ditto—Hen . . . . .   | 1 0          | 10 0          | 5 0          |
| 67.—BANTAMS (Game, any Variety)—Cock . . . . .  | 1 0          | 10 0          | 5 0          |
| 68.—Ditto—Hen . . . . .   | 1 0          | 10 0          | 5 0          |
| 69.—BANTAMS (any other Distinct Variety)—Cock . . . . .                                 | 1 0          | 10 0          | 5 0          |
| 70.—Ditto—Hen . . . . .   | 1 0          | 10 0          | 5 0          |
| <b>TURKEYS.</b>   |              |               |              |
| 71.—TURKEYS (any other Distinct Variety)—Cock . . . . .                                 | 1 10         | 15 0          | 5 0          |
| 72.—Ditto—Hen . . . . .   | 1 10         | 15 0          | 5 0          |
| 73.—Ditto—Pekin . . . . .   | 1 10         | 15 0          | 5 0          |
| 74.—COUPLE OF DUCKS (any other Distinct Variety)—Cock . . . . .                         | 1 10         | 15 0          | 5 0          |
| 75.—Ditto—Hen . . . . .   | 1 10         | 15 0          | 5 0          |
| 76.—TANDER or Goose . . . . .   | 1 10         | 15 0          | 5 0          |
| 77.—TURKEYS (any other Distinct Variety)—Cock . . . . .                                 | 1 10         | 15 0          | 5 0          |
| 78.—Ditto—Hen . . . . .   | 1 10         | 15 0          | 5 0          |



## POULTRY.

### CONDITIONS AND REGULATIONS.

#### CHARGES, &c.

1. Exhibitors may make an unlimited number of Entries in each Class on payment of fees as follows:—

|                                 |                |
|---------------------------------|----------------|
| Classes 1 to 62 inclusive . . . | 5s. per Entry. |
| „ 63 to 70 „ . . .              | 3s. „          |
| „ 71 to 77 „ . . .              | 5s. „          |

The above fees include coops, food, and attendance.

N.B.—The above Fees *must* be sent with the Entries, or no notice will be taken of the latter.

2. All Entries must be made on the printed forms, to be obtained of the Secretary (THOS. F. FLOWMAN, 4, Terrace Walk, Bath), and such forms must be correctly filled up and returned to the Secretary, together with all fees due, on or before May 4. Exhibitors are requested to carefully examine the List of Prizes and Conditions, as the Society cannot be responsible for any errors made by Exhibitors in the Entry-forms, and birds entered in a wrong Class will be necessarily excluded from competition. No alterations can be made in Entry-forms after they have been received by the Secretary.

3. The Council reserve the right to refuse the Entries of any person.

4. Exhibitors must state the price, breed, and age of their birds on their Entry-forms.

#### SHOWYARD.

5. All birds must be in the Showyard on *Tuesday, May 26*, and no bird can be removed before Monday, June 1, at 7 P.M. Any Exhibitors who send for their birds must do so between 7 and 8 P.M. on that day.

6. All carriage must be prepaid to St. Albans Railway Station, otherwise the birds will not be received at the Exhibition; but they will be conveyed free of expense from the Station to the Showyard and back.

7. No Exhibitor or Servant will be allowed into the tent until the birds have been judged.

8. The Poultry Tent will not be open to the public until 2 o'clock on the first day of the Exhibition.

9. One Admission Ticket, available whenever the Show is open to the public, will be given to each Exhibitor whose Entry-fees amount to 1*l.* and upwards.

#### TABLE POULTRY.

10. In Classes 57, 58, 59, 60, 61, 62, and 74, quality for the table will be considered before mere weight. The date of hatching must be given, and in the case of cross-bred birds, the breeds of the parents.

#### SALES.

11. All birds may be claimed, at the price put upon them, any time after 4 o'clock on Wednesday, May 27, and a sale *must take place* if the price stated be paid to the Clerk in the Poultry Office at the time of claiming. *No alteration can be made in the prices stated on the Entry-forms and in the Catalogue until after Friday, May 29*, when the price may be reduced on payment to the Stewards of 1*s.* per pen on each alteration. Birds must be sold *in pens*, and the price stated must include the basket. A charge of 10 per cent. will be made for all birds sold. The persons who have the management of the sales cannot take charge of birds which are disposed of privately.

## *Poultry Conditions and Regulations.*

### AWARDS.

12. Except under a special recommendation from the Judges, no Second Prize will be given in any of the Classes unless there are three Entries, and no Third Prize unless there are six Entries.

### DISQUALIFICATIONS.

13. The Judges are empowered to withhold a prize or prizes where birds are not considered of sufficient merit, or to disqualify any that have been clipped, drawn, trimmed, marked, or dyed, and an Exhibitor detected in a false statement as to the age, &c., of any bird, or in any other practice calculated to deceive or mislead the Judges or Stewards, shall forfeit all or any prizes awarded to him or her at the Show, and will be disqualified from competing at any future Show of the Society.

14. Unhealthy birds will not be exhibited, but will be immediately returned to their owners, and the fees will be forfeited.

### PROTESTS.

15. In order to check frivolous and vexatious protests, no protest will be entertained unless accompanied by a deposit of 1*l.* in each case; and in case the protest is not substantiated, the deposit may be forfeited to the funds of the Society. All protests must be made before 12 o'clock (noon) on Thursday, May 28.

### FORFEITS.

16. Persons entering birds, and failing to send the same to the Exhibition will forfeit the entrance fee for each pen so left vacant.

### GENERAL.

17. All birds shown must be *bonâ fide* the property of the Exhibitor.

18. For each pen entered, the Exhibitor will receive a Label, on the reverse side of which he must legibly write his name and address for the return journey.

19. All Eggs laid at the Exhibition will be destroyed.

20. The Stewards pledge themselves to take every care of the birds exhibited, but neither they nor the Society will in any case be responsible for any accident, loss, or damage, from whatever cause arising, the exhibits being entered at the sole risk of the Exhibitors, and Exhibitors will be required to hold the Society harmless in the event of loss.

21. In case of death of any bird during the Exhibition, it will be sent back for the inspection of the Exhibitor.

22. The Poultry Department is subject to the rules and regulations of the Society and its officers.

*The use of properly-constructed poultry baskets will facilitate the safe and speedy conveyance of the specimens to and from the Exhibition.*

*The Society cannot, under any circumstances, undertake to send telegrams to Exhibitors as to Judges' Awards.*

*Applications for Catalogues (cost 1*s.* each) and printed lists of Awards should be sent to THE PUBLISHERS AND SONS, Herald Office, Bath.*

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| Year. | Place Visited. | Local Subscrip-<br>tion. | Prizes.               |                  |                       | Total Local Contri-<br>bution. | President.                             | Admissions. |               |        |
|-------|----------------|--------------------------|-----------------------|------------------|-----------------------|--------------------------------|--|-------------|---------------|--------|
|       |                |                          | Local Com-<br>mittee. | Local Societies. | Local Resi-<br>dents. |                                |  | On 2d. day. | On 1st. Days. | Total. |
| 1852  | Taunton        | £ 210                    | £ ..                  | £ ..             | £ ..                  | £ 210                          | Lord Portman.                          | ..          | ..            | ..     |
| 1853  | Plymouth       | 450                      | ..                    | ..               | ..                    | 450                            | Sir T. D. Acland, Bart.                | ..          | ..            | ..     |
| 1854  | Bath           | 450                      | ..                    | ..               | ..                    | 450                            | William Miles, M.P.                    | ..          | ..            | ..     |
| 1855  | Tiverton       | 450                      | ..                    | ..               | ..                    | 450                            | Earl Fortescue                         | ..          | ..            | ..     |
| 1856  | Yeovil         | 450                      | ..                    | ..               | ..                    | 450                            | C. A. Moody, M.P.                      | ..          | ..            | ..     |
| 1857  | Newton Abbot   | 700                      | ..                    | ..               | ..                    | 700                            | Lord Courtenay                         | ..          | ..            | ..     |
| 1858  | Cardiff        | 800                      | ..                    | ..               | ..                    | 800                            | Lord Courtenay                         | ..          | ..            | ..     |
| 1859  | Barnstaple     | 800                      | 85                    | ..               | £1                    | 966                            | John Sillifant.                        | ..          | ..            | ..     |
| 1860  | Dorchester     | 900                      | ..                    | ..               | ..                    | 900                            | Lord Rivers                            | 10,709      | 11,949        | 22,658 |
| 1861  | Truro          | 900                      | ..                    | ..               | ..                    | 900                            | J. W. Buller, M.P.                     | 15,201      | 14,220        | 29,421 |
| 1862  | Wells          | 900                      | ..                    | ..               | ..                    | 900                            | Sir T. D. Acland, Bart.                | 10,578      | 4,775         | 15,353 |
| 1863  | Exeter         | 900                      | ..                    | ..               | ..                    | 900                            | Marquis of Bath                        | 15,635      | 19,284        | 34,919 |
| 1864  | Bristol        | 1000                     | 106                   | ..               | 50                    | 1156                           | Earl Fortescue                         | 22,377      | 65,678        | 88,055 |
| 1865  | Hereford       | 900                      | 358                   | ..               | ..                    | 1258                           | Lord Taunton.                          | 16,575      | 35,261        | 51,836 |
| 1866  | Salisbury      | 900                      | 57                    | ..               | ..                    | 957                            | Earl of Portsmouth                     | 7,288       | 18,737        | 26,025 |
| 1867  | Salisbury      | 900                      | ..                    | ..               | ..                    | 900                            | J. Tremayne                            | 7,502       | 16,702        | 24,204 |
| 1868  | Falmouth       | 900                      | 132                   | ..               | 18                    | 1050                           | Sir J. T. B. Duckworth, Bart.          | 11,393      | 19,495        | 30,888 |
| 1869  | Southampton    | 900                      | ..                    | ..               | ..                    | 900                            | Earl of Carnarvon                      | 15,340      | 41,290        | 56,630 |
| 1870  | Taunton        | 900                      | ..                    | ..               | ..                    | 900                            | Sir S. H. Northcote, Bart., C.B., M.P. | 17,952      | 33,638        | 51,605 |
| 1871  | Guildford      | 900                      | 110                   | ..               | ..                    | 1010                           | Earl of Cork                           | 10,656      | 23,406        | 34,062 |
| 1872  | Dorchester     | 800                      | ..                    | ..               | 10                    | 810                            | Duke of Marlborough, K.G.              | 12,791      | 21,517        | 34,308 |
| 1873  | Plymouth       | 800                      | ..                    | 400              | ..                    | 1200                           | Earl of Mount-Edgumbe                  | 16,665      | 45,744        | 62,409 |

## ANNUAL EXHIBITIONS—continued.

| Year. | Place Visited.  | Local Subscription. | Prizes.          |                  |                   | Total Local Contribution. | President.                    | Admissions.  |               |         |
|-------|-----------------|---------------------|------------------|------------------|-------------------|---------------------------|-------------------------------|--------------|---------------|---------|
|       |                 |                     | Local Committee. | Local Societies. | Local Residences. |                           |                               | On 2d. days. | On 1st. Days. | Total.  |
| 1874  | Bristol         | £ 800               | £ 403            | £ ..             | £ ..              | £ 1203                    | Sir Massey Lopes, Bart., M.P. | 37,329       | 72,791        | 110,120 |
| 1875  | Croydon.        | 800                 | 245              | ..               | ..                | 1045                      | R. Benyon, M.P.               | 14,518       | 26,028        | 40,546  |
| 1876  | Hereford        | 800                 | 381              | ..               | ..                | 1181                      | Earl of Ducie                 | 16,396       | 32,645        | 49,041  |
| 1877  | Bath            | 800                 | 215              | ..               | ..                | 1015                      | Marquis of Lansdowne          | 27,625       | 48,852        | 76,477  |
| 1878  | Oxford          | 800                 | ..               | 170              | 6                 | 976                       | Earl of Jersey.               | 12,414       | 26,995        | 39,409  |
| 1879  | Exeter          | 800                 | ..               | ..               | 10                | 810                       | Earl of Morley                | 14,634       | 40,533        | 55,167  |
| 1880  | Worcester       | 800                 | ..               | 254              | ..                | 1054                      | Earl of Coventry              | 8,415        | 37,675        | 46,090  |
| 1881  | Tunbridge Wells | 800                 | 245              | 34               | ..                | 1079                      | Marquess of Abercromby        | 13,388       | 33,236        | 46,604  |
| 1882  | Cardiff         | 800                 | 200              | 198              | 17                | 1215                      | Lord Tredegar                 | 23,941       | 38,680        | 62,621  |
| 1883  | Bridgwater      | 800                 | 78               | ..               | ..                | 878                       | Lord Brooke, M.P.             | 17,171       | 31,241        | 48,412  |
| 1884  | Marlstone       | 800                 | 310              | 33               | 75                | 1218                      | Viscount Holmesdale.          | 13,501       | 31,053        | 44,554  |
| 1885  | Brighton        | 800                 | 227              | 33               | 82                | 1142                      | Viscount Hampden              | 9,637        | 39,851        | 49,488  |
| 1886  | Bristol         | 800                 | 525              | ..               | ..                | 1325                      | Lord Carlingford              | 29,580       | 70,999        | 100,579 |
| 1887  | Dorchester      | 800                 | ..               | 112              | ..                | 912                       | Earl of Ilchester             | 8,860        | 29,846        | 38,706  |
| 1888  | Newport (Mon.)  | 800                 | 100              | ..               | ..                | 900                       | Lord Tredegar                 | 14,878       | 38,557        | 53,445  |
| 1889  | Exeter          | 800                 | ..               | ..               | 10                | 810                       | Lord Clinton                  | 16,405       | 36,195        | 52,600  |
| 1890  | Rochester       | 800                 | 294              | ..               | 26                | 1120                      | Earl of Daruley               | 8,480        | 48,314        | 51,794  |
| 1891  | Bath            | 800                 | 50               | 103              | 100               | 1053                      | Earl Temple                   | 23,510       | 52,185        | 75,695  |
| 1892  | Swansea         | 800                 | 200              | 100              | 10                | 1110                      | Sir J. T. D. Llewelyn, Bart.  | 18,364       | 54,609        | 72,973  |
| 1893  | Gloucester      | 800                 | 400              | ..               | ..                | 1200                      | Lord Fitzhardinge             | 14,272       | 40,368        | 54,640  |
| 1894  | Guildford       | 800                 | 174              | ..               | 10                | 984                       | Earl of Onslow                | 8,671        | 25,813        | 38,484  |
| 1895  | Taunton         | 800                 | 85               | 160              | 10                | 1055                      | Viscount Portman              | 13,181       | 30,111        | 43,292  |
| 1896  | St. Albans      | 800                 | ..               | ..               | ..                | ..                        | Earl Clarendon                | ..           | ..            | ..      |

# FINANCIAL STATEMENTS

FOR

1895

*WITH ITEMS OF 1894 FOR COMPARISON.*

|                                     | PAGES       |
|-------------------------------------|-------------|
| Summary of the Cash Account .. .. . | civ., cv.   |
| Detailed Cash Account .. .. .       | cvi.-cxvii. |
| Assets and Liabilities .. .. .      | cxviii.     |

**The Bath and West**  
**SUMMARY OF THE CASH ACCOUNT**  
**WITH COMPANION**

Dr.

| RECEIPTS.  |           | 1895.<br>TAUNTON. |                |     |
|--|-----------|-------------------|----------------|-----|
|  |           | £ s. d.           | £ s. d.        |     |
| <b>General Receipts:—</b>                              |           |                   |                |     |
| Dividends and Interest                                 |           | 653 13 0          |                | 6   |
| Subscriptions from Members                             |           | 1,169 17 0        |                | 1,6 |
| Life Compositions                                      |           | 40 0 0            |                |     |
| Journal  |           | 46 10 2           |                |     |
| Sale of Waste Paper, &c.                               |           | ..                |                |     |
|  |           |                   | 1,910 0 2      | 1,9 |
| <b>Show Receipts:—</b>                                 |           |                   |                |     |
| Implements   |           | 1,743 6 10        |                | 1,6 |
|  | £ s. d.   |                   |                |     |
| Horses   | 249 6 6   |                   |                | 1   |
| Cattle, Sheep, and Pigs                                | 419 11 0  |                   |                | 4   |
| Catalogues, &c.  | 86 4 5    |                   |                |     |
|  |           | 755 1 11          |                | 7   |
| Poultry  |           | 95 18 6           |                |     |
| Horse Shoeing  |           | 30 7 0            |                |     |
| Arts   | 9 11 7    |                   |                |     |
| Art Union  | 23 1 0    |                   |                |     |
| Art-Manufactures                                       | 123 6 0   |                   |                |     |
|  |           | 215 18 7          |                |     |
| Cheese and Butter                                      |           | 202 14 8          |                |     |
| Working Dairy  |           | 195 2 0           |                |     |
| Sheep Shearing   |           | 9 10 0            |                |     |
| Corn and Hops  |           | ..                |                |     |
| Cider  |           | 26 10 0           |                |     |
| Refreshment Contracts                                  |           | 538 0 0           |                |     |
| Admissions   |           | 3,096 10 3        |                | 3   |
| <b>Unapportionable:—</b>                               |           |                   |                |     |
| Cloak Rooms, &c.                                       | 30 10 0   |                   |                |     |
| Stand Fittings   | 212 10 11 |                   |                |     |
|  |           | 243 0 11          |                |     |
| Subscription from St. Albans for 1896 Show             |           | 800 0 0           |                |     |
|  |           |                   | 7,952 0 8      | 7   |
| Schools  |           | ..                | 2,552 13 10    | 1   |
| Experiments  |           | ..                | 400 0 0        |     |
|  |           |                   | 12,814 14 8    | 1   |
| Returned on Deposit Account                            |           | ..                | ..             |     |
| BALANCE BROUGHT FORWARD, JAN. 1, 1895                  |           | ..                | 164 0 9        |     |
| Balance due to Bank (inclusive of outstanding Cheques) |           | ..                | 338 4 6        |     |
|  |           |                   | £ 13,316 19 11 | 1   |

**ithern Counties Society.**

**THE YEAR ENDING DEC. 31st, 1895,  
MENT FOR 1894.**

CR.

| PAYMENTS.                               |         | 1895.<br>TAUNTON. |                | 1894.<br>GUILDFORD. |       |
|---|---------|-------------------|----------------|---------------------|-------|
|   |         | £ s. d.           | £ s. d.        | £ s. d.             |       |
| <b>General Expenses:—</b>               |         |                   |                |                     |       |
| Salaries . . . . .                      |         | 775               | 0 0            | 775                 | 0 0   |
| Rent, Postage, Stationery, &c. . . . .  |         | 295               | 13 7           | 264                 | 0 9   |
| Journal . . . . .                       |         | 438               | 3 10           | 448                 | 3 11  |
|   |         |                   | 1,508 17 5     | 1,487               | 4 8   |
| <b>Show Expenses:—</b>                  |         |                   |                |                     |       |
| Implements . . . . .                    |         | 656               | 15 1           | 667                 | 16 3  |
|   | £ s. d. |                   |                |                     |       |
| Horses . . . . .                        | 940     | 0 5               |                | 787                 | 2 10  |
| Cattle, Sheep, and Pigs . . . . .       | 2,044   | 0 3               |                | 2,184               | 15 11 |
| Fodder, &c. . . . .                     | 333     | 4 6               |                | 509                 | 6 0   |
|   |         | 3,317             | 5 2            | 3,381               | 4 9   |
| Poultry . . . . .                       |         | 260               | 17 6           | 294                 | 2 0   |
| Horse Shoeing . . . . .                 |         | 84                | 10 1           | 55                  | 0 2   |
| Arts . . . . .                          | 252     | 17 0              |                | 263                 | 16 2  |
| Art Union . . . . .                     | 182     | 16 2              |                | 216                 | 2 3   |
| Art-Manufactures . . . . .              | 64      | 6 4               |                | 58                  | 1 4   |
|   |         | 499               | 19 6           | 537                 | 19 9  |
| Music . . . . .                         |         | 181               | 8 10           | 219                 | 15 1  |
| Horticulture . . . . .                  |         | 189               | 17 1           | 184                 | 17 1  |
| Cheese and Butter . . . . .             |         | 465               | 15 9           | 300                 | 6 6   |
| Working Dairy . . . . .                 |         | 544               | 8 9            | 463                 | 0 11  |
| Sheep Shearing . . . . .                |         | 32                | 15 1           | 15                  | 0 0   |
| Corn and Hops . . . . .                 |         | ..                |                | 31                  | 2 6   |
| Cider . . . . .                         |         | 55                | 16 4           |                     |       |
| Bees . . . . .                          |         | 10                | 0 0            | 10                  | 0 0   |
| Public Announcements . . . . .          |         | 481               | 0 3            | 445                 | 4 3   |
| Refreshment Contracts . . . . .         |         | 182               | 8 2            | 186                 | 10 6  |
| <b>Show Expenses, Unapportionable:—</b> |         |                   |                |                     |       |
| Stand Fittings . . . . .                | 101     | 4 4               |                | 116                 | 15 8  |
| Erection of Offices, &c. . . . .        | 848     | 2 6               |                | 915                 | 9 8   |
| Carriage of Plant . . . . .             | ..      |                   |                | 133                 | 7 4   |
| Police . . . . .                        | 78      | 1 6               |                | 118                 | 10 11 |
| Miscellaneous . . . . .                 | 311     | 7 1               |                | 323                 | 17 1  |
|   |         | 1,338             | 15 5           | 1,598               | 0 8   |
|   |         |                   | 8,301 13 0     | 8,359               | 19 11 |
| Schools . . . . .                       |         | ..                | 2,707 1 6      | 2,554               | 0 10  |
| Experiments . . . . .                   |         | ..                | 799 8 0        | 699                 | 5 11  |
|   |         |                   |                | 13,130              | 11 4  |
| Balance in Bank . . . . .               |         | ..                |                | 164                 | 0 9   |
|   |         |                   | £ 13,316 19 11 | 13,294              | 12 1  |

ited and found correct,  
**ALBERT GOODMAN, F.C.A.,**

uary 17th, 1896.

Auditor.

Passed by Council,  
January 28th, 1896.

**THOS. F. FLOWMAN,**  
Secretary.

# **The Bath and West an**

**Dr. CASH ACCOUNT FOR THE YEAR ENDING DEC. 31**

| RECEIPTS.                                   |  | 1895.<br>TAUNTON. |    |         | 1894<br>Grove |
|---|--|-------------------|----|---------|---------------|
|   |  | £                 | s. | d.      | £ s.          |
| <b>DIVIDENDS AND INTEREST:—</b>             |  |                   |    |         |               |
| Consols . . . . .                           |  | 96                | 0  | 0       | 92            |
| New Zealand Stock . . . . .                 |  | 53                | 1  | 0       | 53            |
| India Stock . . . . .                       |  | 261               | 4  | 4       | 261 1         |
| Canada Stock . . . . .                      |  | 69                | 4  | 10      | 69            |
| Queensland Stock . . . . .                  |  | 106               | 7  | 8       | 106 1         |
| New South Wales Stock . . . . .             |  | 67                | 15 | 2       | 67 1          |
| Interest on Deposit . . . . .               |  | ..                |    |         | 19            |
|   |  |                   |    |         |               |
|   |  |                   |    | 653     | 13 0          |
|   |  |                   |    |         | 670           |
| <b>SUBSCRIPTIONS FROM MEMBERS:—</b>         |  |                   |    |         |               |
| Arrears . . . . .                           |  | 53                | 12 | 6       | 46            |
| Governors . . . . .                         |  | 245               | 12 | 0       | 231           |
| Subscribers of £1 and upwards . . . . .     |  | 844               | 1  | 0       | 790           |
| 10th of 10s. . . . .                        |  | 26                | 11 | 6       | 27            |
|   |  |                   |    |         |               |
|   |  |                   |    | 1,169   | 17 0          |
|   |  |                   |    |         | 1,097 1       |
| <b>LIFE COMPOSITIONS . . . . .</b>          |  |                   |    |         |               |
|   |  |                   |    | 40      | 0 0           |
|   |  |                   |    |         | 70            |
| <b>JOURNAL:—</b>                            |  |                   |    |         |               |
| Sales . . . . .                             |  | 21                | 6  | 8       | 17 1          |
| Advertisements . . . . .                    |  | 22                | 3  | 6       | 30 1          |
|   |  |                   |    |         |               |
|   |  |                   |    | 46      | 10 2          |
|   |  |                   |    |         | 48            |
| <b>SALE OF WASTE PAPER, &amp;c. . . . .</b> |  |                   |    |         |               |
|   |  |                   |    | ..      | 0 1           |
| <b>IMPLEMENTS:—</b>                         |  |                   |    |         |               |
| Entry Fees . . . . .                        |  | 72                | 10 | 0       | 77 1          |
| Fees for Space . . . . .                    |  |                   |    |         |               |
| Machinery-in-Motion Shedding . . . . .      |  | 333               | 5  | 0       | 363           |
| Ordinary Shedding . . . . .                 |  | 446               | 0  | 0       | 461 1         |
| Miscellaneous Shedding . . . . .            |  | 303               | 15 | 0       | 315           |
| Boarded Do. . . . .                         |  | 270               | 7  | 6       | 256 1         |
| Seed Do. . . . .                            |  | 39                | 0  | 0       | 49            |
| Uncovered Ground . . . . .                  |  | 148               | 15 | 10      | 90            |
| Catalogue Fees . . . . .                    |  | 129               | 13 | 6       | 133 1         |
|   |  |                   |    |         |               |
|   |  |                   |    | 1,743   | 6 10          |
|   |  |                   |    |         | 1,687         |
| Carried forward . . . . .                   |  | ..                |    | £ 3,653 | 7 0           |



**thern Counties Society.****WITH COMPARATIVE STATEMENT FOR 1894.****Ch.**

| PAYMENTS.   | 1895.<br>TAUNTON. |            | 1894.<br>GUILDFORD. |          |
|---|-------------------|------------|---------------------|----------|
|   | £                 | s. d.      | £                   | s. d.    |
| <b>GENERAL:—</b>  |                   |            |                     |          |
| Salaries:—  |                   |            |                     |          |
| Secretary (including Clerks, Gas, Coal, Lodgings at Show, &c.). | 700               | 0 0        | 700                 | 0 0      |
| Auditor . . . . .   | 20                | 0 0        | 20                  | 0 0      |
| Consulting Chemist . . . . .                                    | 30                | 0 0        | 30                  | 0 0      |
| Consulting Botanist . . . . .                                   | 25                | 0 0        | 25                  | 0 0      |
|   |                   | 775 0 0    |                     | 775 0 0  |
| Printing . . . . .  | 47                | 17 6       | 36                  | 14 3     |
| Stationery and Finance Books . . . . .                          | 37                | 14 2       | 46                  | 14 1     |
| Postage, Telegrams, Cheque and Receipt Stamps                   | 80                | 10 11      | 76                  | 8 10     |
| Rent of Offices . . . . .                                       | 28                | 0 0        | 26                  | 0 0      |
| Travelling Expenses . . . . .                                   | 24                | 14 11      | 23                  | 9 4      |
| Carriage of Goods . . . . .                                     | 9                 | 2 3        | 10                  | 13 4     |
| Directories and Reference Books . . . . .                       | 2                 | 14 10      | 2                   | 3 0      |
| Finance Committee's Expenses . . . . .                          | 7                 | 5 9        | 8                   | 13 10    |
| Subscriptions . . . . .   | 3                 | 3 0        | 3                   | 3 0      |
| Repairs, &c. . . . .  | 5                 | 18 9       | 6                   | 5 1      |
| Hire of London Rooms for Councils and Committees                | 5                 | 11 6       | 3                   | 16 0     |
| Grant to Mrs. Jones (widow of late Foreman of Plant)            | 20                | 0 0        | 20                  | 0 0      |
| Grant to Railway Benevolent Institution . . .                   | 25                | 0 0        | ..                  |          |
|   |                   | 295 13 7   |                     | 284 0 9  |
| <b>JOURNAL:—</b>  |                   |            |                     |          |
| Editor . . . . .  | 100               | 0 0        | 100                 | 0 0      |
| Associate Editor . . . . .                                      | 100               | 0 0        | 100                 | 0 0      |
| Printing and Binding . . . . .                                  | 162               | 14 9       | 146                 | 19 6     |
| Plans . . . . .   | 3                 | 14 6       | 3                   | 14 6     |
| Journal Distribution . . . . .                                  | 25                | 8 4        | 30                  | 12 1     |
| Postage, Stationery, &c. . . . .                                | 7                 | 9 3        | 16                  | 3 10     |
| Payments to Authors . . . . .                                   | 38                | 17 0       | 50                  | 14 0     |
|   |                   | 438 3 10   |                     | 448 3 11 |
| <b>IMPLEMENTS:—</b>   |                   |            |                     |          |
| Shedding . . . . .  | 544               | 11 3       | 560                 | 0 5      |
| Stewards and Assistants . . . . .                               | 69                | 0 7        | 67                  | 1 8      |
| Printing and Stationery . . . . .                               | 43                | 3 3        | 46                  | 13 2     |
| Fees returned, &c. . . . .                                      | ..                |            | 4                   | 1 0      |
|   |                   | 656 15 1   |                     | 667 16 3 |
| Carried forward . . . . .                                       | ..                | 2,165 12 6 |                     |          |

**TAUNTON MEETING, 1895.**

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DR.

**CASH ACCOUNT—continued.**

| RECEIPTS.                                | 1895.<br>TAUNTON. |       | 1894<br>GUILDFORD |
|--|-------------------|-------|-------------------|
|  | £                 | s. d. | £                 |
| Brought forward . . . .                  | ..                |       | 3,653 7 0         |
| <b>HORSES, CATTLE, SHEEP, AND PIGS:—</b> |                   |       |                   |
|  | £                 | s. d. |                   |
| Horses:—Entry Fees . . . .               | 114               | 10 0  | 100 10            |
| Fines and Forfeits . . . .               | 2                 | 0 0   | 2 10              |
| Grand Stand Admissions . . . .           | 90                | 16 6  | 77 10             |
| Special Prizes . . . .                   | 42                | 0 0   | 36 10             |
|  | 249               | 6 6   | 217 10            |
| Cattle, Sheep and Pigs:—                 |                   |       |                   |
| Entry Fees . . . .                       | 266               | 10 0  | 264 10            |
| Fines . . . .                            | 12                | 11 0  | 19 10             |
| Special Prizes . . . .                   | 140               | 10 0  | 139 10            |
|  | 419               | 11 0  | 423 10            |
| Catalogues . . . .                       | 80                | 14 11 | 80 10             |
| Manure and Fodder . . . .                | 5                 | 9 6   | 7 10              |
|  | 86                | 4 5   | 88 10             |
|  |                   |       | 765 1 11          |
| <b>POULTRY:—</b>                         |                   |       |                   |
| Entry Fees . . . .                       | 95                | 12 0  | 97 10             |
| Commission on Sales . . . .              | 0                 | 6 6   | 6 10              |
|  |                   |       | 95 18 6           |
| <b>HORSE-SHOEING:—</b>                   |                   |       |                   |
| Entry Fees . . . .                       | 28                | 5 0   | 14 10             |
| Special Prizes . . . .                   | 2                 | 2 0   | 11 10             |
|  |                   |       | 30 7 0            |
| Carried forward . . . .                  | ..                |       | 4,534 14 5        |

## CASH ACCOUNT—continued.

Ct.

| P A Y M E N T S.                                      | 1895.    |    |    | 1894.      |    |    |
|---|----------|----|----|------------|----|----|
|   | TAUNTON. |    |    | GUILDF RD. |    |    |
|   | £        | s. | d. | £          | s. | d. |
| Brought forward . . . . .                             | ..       |    |    | 2,165      | 12 | 6  |
| HORSES, CATTLE, SHEEP, AND PIGS:—                     |          |    |    |            |    |    |
| Horses—Prizes . . . . .                               | £        | s. | d. |            |    |    |
| Less deferred . . . . .                               | 530      | 0  | 0  |            |    |    |
|   | 10       | 0  | 0  |            |    |    |
|   |          |    |    | 441        | 0  | 0  |
|   |          |    |    | 10         | 0  | 0  |
|   |          |    |    | 430        | 0  | 0  |
| Shedding and Grand Stand . . . . .                    | 520      | 0  | 0  | 293        | 0  | 8  |
| Stewards and Assistants . . . . .                     | 251      | 10 | 11 | 39         | 14 | 0  |
| Judges . . . . .                                      | 45       | 3  | 8  | 21         | 15 | 8  |
| Miscellaneous . . . . .                               | 23       | 4  | 4  | 2          | 12 | 6  |
|   | 0        | 1  | 6  |            |    |    |
|   |          |    |    | 787        | 2  | 10 |
|   |          |    |    |            |    |    |
|   |          |    |    | 1,157      | 10 | 0  |
| Cattle—Prizes . . . . .                               | 1,231    | 10 | 0  | 20         | 0  | 0  |
| Less deferred . . . . .                               | 55       | 0  | 0  |            |    |    |
|   |          |    |    | 1,137      | 10 | 0  |
|   |          |    |    | 469        | 0  | 0  |
| Sheep—Prizes . . . . .                                | 1,176    | 10 | 0  | 228        | 8  | 5  |
| Shedding and Canvas . . . . .                         | 457      | 0  | 0  | 41         | 6  | 5  |
| Stewards and Assistants . . . . .                     | 234      | 14 | 9  | 144        | 16 | 1  |
| Judges . . . . .                                      | 38       | 13 | 1  | 63         | 15 | 0  |
| Fees Returned, &c. . . . .                            | 134      | 18 | 11 |            |    |    |
|   | 2        | 3  | 6  |            |    |    |
|   |          |    |    | 2,084      | 15 | 11 |
|   |          |    |    |            |    |    |
|   |          |    |    | 35         | 15 | 8  |
| Canvas, &c. . . . .                                   | 23       | 7  | 9  | 328        | 3  | 6  |
| Fodder . . . . .                                      | 180      | 13 | 6  |            |    |    |
| Steward of Fodder and Assistants . . . . .            |          |    |    | 39         | 10 | 1  |
| and Horse hire . . . . .                              | 23       | 9  | 6  | 23         | 4  | 6  |
| Veterinary Inspector . . . . .                        | 25       | 13 | 6  | 9          | 12 | 7  |
| Rosettes . . . . .                                    | 9        | 12 | 7  | 53         | 11 | 11 |
| Printing and Stationery . . . . .                     | 56       | 10 | 4  | 14         | 7  | 11 |
| Refreshments to Judges . . . . .                      | 13       | 17 | 4  | 5          | 0  | 0  |
| Deferred Prizes (1893) . . . . .                      | ..       |    |    |            |    |    |
|   |          |    |    | 509        | 6  | 0  |
|   |          |    |    |            |    |    |
|   |          |    |    | 333        | 4  | 6  |
|   |          |    |    | 3,317      | 5  | 2  |
|   |          |    |    |            |    |    |
|   |          |    |    | 56         | 17 | 6  |
| Marquee, Staging and Sheds . . . . .                  | 18       | 10 | 11 | 21         | 7  | 6  |
| Steward and Assistants . . . . .                      | 12       | 17 | 6  | 13         | 15 | 6  |
| Judges . . . . .                                      | 162      | 15 | 0  | 182        | 15 | 0  |
| Prizes . . . . .                                      | 6        | 13 | 9  | 9          | 2  | 6  |
| Printing and Stationery . . . . .                     | 3        | 2  | 10 | 6          | 11 | 0  |
| Cartage, Hampers, &c. . . . .                         | ..       |    |    | 3          | 13 | 0  |
| Food and Pens . . . . .                               |          |    |    |            |    |    |
|   |          |    |    | 260        | 17 | 6  |
|   |          |    |    |            |    |    |
|   |          |    |    | 23         | 10 | 0  |
| Prizes . . . . .                                      | 27       | 17 | 6  | 18         | 16 | 0  |
| Judges . . . . .                                      | 21       | 7  | 6  | 12         | 14 | 2  |
| Anvils, Forges, Coals, Horses, and Printing . . . . . | 3        | 8  | 9  | ..         |    |    |
| Shedding . . . . .                                    | 28       | 10 | 0  | ..         |    |    |
| Steward and Assistants . . . . .                      | 3        | 6  | 4  |            |    |    |
|   |          |    |    | 84         | 10 | 1  |
|   |          |    |    |            |    |    |
|   |          |    |    | 55         | 0  | 2  |
|   |          |    |    |            |    |    |
| Carried forward . . . . .                             | ..       |    |    | 25,828     | 5  | 3  |

**TAUNTON MEETING, 1895.**

( CX )

**Dr.**

**CASH ACCOUNT—continued.**

| RECEIPTS.                                | 1895.<br>TAUNTON. |       |     | 1894.<br>GUILDFORD. |
|--|-------------------|-------|-----|---------------------|
|  | £                 | s.    | d.  | £ s. d.             |
| Brought forward . . . . .                | ..                |       |     | 4,834 14 5          |
| <b>ARTS:—</b>                            |                   |       |     |                     |
| Commission on Picture Sales, &c. . . . . | 4                 | 11    | 7   | 7 6 0               |
| Catalogues . . . . .                     | 5                 | 0     | 0   | 5 0 0               |
|  |                   |       |     | 9 11 7              |
| <b>ART UNION:—</b>                       |                   |       |     |                     |
| Sale of Tickets . . . . .                | 77                | 16    | 0   | 55 0 0              |
| Excess paid on Prizes. . . . .           | 5                 | 2     | 6   | 26 3 0              |
| Cash money . . . . .                     | 0                 | 3     | 6   | 0 13 0              |
|  |                   |       |     | 83 1 0              |
| <b>ART MANUFACTURES:—</b>                |                   |       |     |                     |
| Fees for Space . . . . .                 | ..                |       |     | 123 6 0             |
|  |                   |       |     | 60 12               |
| <b>CHEESE AND BUTTER:—</b>               |                   |       |     |                     |
| Entry Fees . . . . .                     | 121               | 7     | 6   | 66 10 0             |
| Cheese and Butter Sales . . . . .        | 20                | 7     | 2   | 13 2 0              |
| Special Prizes . . . . .                 | 61                | 0     | 0   | 16 5 0              |
| Cheese and Butter Sales (1893) . . . . . | ..                |       |     | 11 11 0             |
|  |                   |       |     | 202 14 8            |
| <b>WORKING DAIRY:—</b>                   |                   |       |     |                     |
| Admissions . . . . .                     | 23                | 4     | 6   | 17 17 0             |
| Entry Fees, Competitions . . . . .       | 71                | 2     | 6   | 47 0 0              |
| Ditto Dairy Appliances . . . . .         | 8                 | 2     | 0   | 17 17 0             |
| Ditto Butter Test Prizes . . . . .       | 24                | 3     | 0   | 21 0 0              |
|  |                   |       |     | 103 7 6             |
| Special Prizes . . . . .                 | 32                | 0     | 0   | 66 17 0             |
| Premium on Produce Sales. . . . .        | 5                 | 0     | 0   | 19 5 0              |
| Sale of Thatching Straw . . . . .        | 31                | 10    | 0   | 10 10 0             |
|  |                   |       |     | 196 3 0             |
| Carried forward . . . . .                | £                 | 5,148 | 9 8 | 133 9 0             |

**CASH ACCOUNT—continued.**

CR.

| PAYMENTS.  | 1895.<br>TAUNTON. |    |    | 1894.<br>GUILDFORD. |    |          |
|--|-------------------|----|----|---------------------|----|----------|
|  | £                 | s. | d. | £                   | s. | d.       |
| Brought forward . . . . .                              | ..                |    |    | 5,828               | 5  | 3        |
| <b>ARTS:—</b>  |                   |    |    |                     |    |          |
| Labour and Fittings . . . . .                          | 56                | 4  | 6  |                     |    | 53 19 10 |
| Steward and Assistants . . . . .                       | 30                | 7  | 0  |                     |    | 35 12 5  |
| Receiving Steward . . . . .                            | 40                | 0  | 0  |                     |    | 40 0 0   |
| Hanging and re-packing Pictures . . . . .              | 38                | 6  | 5  |                     |    | 29 13 6  |
| Local Agents and Carriage . . . . .                    | 79                | 6  | 7  |                     |    | 73 15 9  |
| Printing and Stationery . . . . .                      | 8                 | 12 | 6  |                     |    | 10 14 8  |
| Selector . . . . .                                     | ..                |    |    | ..                  |    | 20 0 0   |
|  |                   |    |    | 252                 | 17 | 0        |
| <b>ART UNION:—</b>                                     |                   |    |    |                     |    | 263 16 2 |
| Pictures Purchased . . . . .                           | 166               | 9  | 10 |                     |    | 198 13 5 |
| Printing and Stationery . . . . .                      | 6                 | 8  | 10 |                     |    | 6 16 10  |
| Advertising . . . . .                                  | 2                 | 2  | 0  |                     |    | 2 2 0    |
| Commission on Sale of Tickets . . . . .                | 7                 | 15 | 6  |                     |    | 8 10 0   |
|  |                   |    |    | 182                 | 16 | 2        |
| <b>ART-MANUFACTURES:—</b>                              |                   |    |    |                     |    | 216 2 3  |
| Labour and Fittings . . . . .                          | 56                | 4  | 4  |                     |    | 51 17 6  |
| Steward and Assistants . . . . .                       | 5                 | 11 | 6  |                     |    | 2 10 0   |
| Printing . . . . .                                     | 2                 | 10 | 6  |                     |    | 3 13 10  |
|  |                   |    |    | 64                  | 6  | 4        |
| <b>MUSIC:—</b>   |                   |    |    |                     |    | 58 1 4   |
| Band and their Fares . . . . .                         | 158               | 1  | 3  |                     |    | 200 0 0  |
| Erecting Band Stand and Seats . . . . .                | 16                | 12 | 7  |                     |    | 16 12 7  |
| Steward and Assistants . . . . .                       | 6                 | 15 | 0  |                     |    | 3 2 6    |
|  |                   |    |    | 181                 | 8  | 10       |
| <b>HORTICULTURE:—</b>                                  |                   |    |    |                     |    | 219 15 1 |
| Gratuities to Gardeners . . . . .                      | 102               | 0  | 0  |                     |    | 102 0 0  |
| Erecting and Repairing Tent and Staging . . . . .      | 63                | 2  | 0  |                     |    | 51 15 4  |
| Steward and Assistants . . . . .                       | 18                | 7  | 1  |                     |    | 31 1 9   |
| Printing, Stationery, Carriage, &c. . . . .            | 6                 | 8  | 0  |                     |    | ..       |
|  |                   |    |    | 189                 | 17 | 1        |
| <b>CHEESE AND BUTTER:—</b>                             |                   |    |    |                     |    | 184 17 1 |
| Judges . . . . .                                       | 18                | 17 | 0  |                     |    | 11 17 9  |
| Prizes . . . . .                                       | 298               | 0  | 0  |                     |    | 211 5 0  |
| Stewards and Assistants . . . . .                      | 11                | 7  | 2  |                     |    | 8 2 7    |
| Shedding . . . . .                                     | 125               | 7  | 10 |                     |    | 53 8 0   |
| Printing, Stationery, Carriage, &c. . . . .            | 4                 | 9  | 9  |                     |    | 6 0 9    |
| Grass Table for Butter . . . . .                       | 7                 | 14 | 0  |                     |    | 9 12 5   |
|  |                   |    |    | 465                 | 15 | 9        |
| <b>WORKING DAIRY:—</b>                                 |                   |    |    |                     |    | 300 6 6  |
| Stewards and Assistants . . . . .                      | 63                | 5  | 1  |                     |    | 68 3 11  |
| Judges and Demonstrators . . . . .                     | 61                | 4  | 1  |                     |    | 43 2 7   |
| Building . . . . .                                     | 293               | 18 | 4  |                     |    | 248 13 4 |
| Printing, Stationery, Postage, and Insurance . . . . . | 9                 | 9  | 10 |                     |    | 6 7 11   |
| Utensils, Carriage, &c. . . . .                        | 18                | 10 | 6  |                     |    | 14 16 7  |
| Prizes . . . . .                                       | 88                | 19 | 2  |                     |    | 73 4 2   |
| Coal, Salt, Ice, &c. . . . .                           | 9                 | 1  | 9  |                     |    | 8 12 1   |
|  |                   |    |    | 544                 | 8  | 9        |
| Carried forward . . . . .                              | ..                |    |    | £ 7,709             | 15 | 2        |

**TAUNTON MEETING, 1895.** ( cxii )

Dr.

**CASH ACCOUNT—continued.**

| RECEIPTS.   | 1895.<br>TAUNTON. |    |      |       | 1894<br>GUILDS |
|---|-------------------|----|------|-------|----------------|
|   | £                 | s. | d.   | £     | s.             |
| Brought forward . . . . .                             | ..                |    |      | 5,148 | 9 8            |
| <b>SHEEP SHEARING:—</b>                               |                   |    |      |       |                |
| Entry Fees . . . . .                                  |                   | 9  | 10 0 |       | 11             |
| Special Prizes . . . . .                              |                   | .. |      |       | 10             |
|   |                   |    |      | 9     | 10 0           |
| <b>CORN AND HOPS . . . . .</b>                        |                   |    |      | ..    | 31             |
| <b>CIDER.—</b>  |                   |    |      |       |                |
| Entry Fees . . . . .                                  |                   | 8  | 10 0 |       |                |
| Special Prizes . . . . .                              |                   | 18 | 0 0  |       |                |
|   |                   |    |      | 26    | 10 0           |
| <b>ADMISSIONS TO SHOWYARD:—</b>                       |                   |    |      |       |                |
| Admissions at 2s. 6d. . . . .                         | 1,535             | 5  | 3    |       | 1,063          |
| Ditto at 1s. . . . .                                  | 1,373             | 2  | 0    |       | 1,337          |
| Children at 1s. . . . .                               | 46                | 11 | 0    |       | 34             |
| Ditto at 6d. . . . .                                  | 66                | 4  | 6    |       | 16             |
| Season Tickets . . . . .                              | 75                | 7  | 6    |       | 64             |
|   |                   |    |      | 3,096 | 10 3           |
|   |                   |    |      |       | 2,586          |
| <b>SHOW REFRESHMENT CONTRACTS:—</b>                   |                   |    |      |       |                |
| Sale Premiums . . . . .                               | ..                |    |      | 53s   | 0 0            |
|   |                   |    |      |       | 468            |
| <b>SHOW RECEIPTS, UNAPPORTIONABLE:—</b>               |                   |    |      |       |                |
| Stand-fittings . . . . .                              | 212               | 10 | 11   |       | 223            |
| Cloak Room, Parcels Office, and Photographs . . . . . | 30                | 10 | 0    |       | 33             |
|   |                   |    |      | 243   | 0 11           |
|   |                   |    |      |       | 254            |
| <b>SUBSCRIPTIONS FROM TOWNS:—</b>                     |                   |    |      |       |                |
| St. Albans, for 1896 Show . . . . .                   | ..                |    |      | 500   | 0 0            |
|   |                   |    |      |       | 500            |
| Carried forward. . . . .                              | ..                |    |      | 2     | 9,092 0 10     |

**CASH ACCOUNT—continued.****Cr.**

| P A Y M E N T S.  | 1895.<br>TAUNTON. |    |    | 1894.<br>GUILDFORD. |    |    |
|---|-------------------|----|----|---------------------|----|----|
|   | £                 | s. | d. | £                   | s. | d. |
| Brought forward . . . . .                                 | ..                |    |    | 7,709               | 15 | 2  |
| <b>SHEEP SHEARING:—</b>                                   |                   |    |    |                     |    |    |
| Prizes . . . . .  | 20                | 10 | 0  | 10                  | 0  | 0  |
| Judges . . . . .  | 5                 | 15 | 0  | 5                   | 0  | 0  |
| Steward . . . . .   | 1                 | 0  | 0  | ..                  |    |    |
| Shedding and Printing . . . . .                           | 5                 | 10 | 1  | ..                  |    |    |
|   |                   |    |    | 32                  | 15 | 1  |
| <b>CORN AND HOPS . . . . .</b>                            | ..                |    |    | ..                  |    |    |
|   |                   |    |    | 31                  | 2  | 6  |
| <b>CIDER:—</b>  |                   |    |    |                     |    |    |
| Shedding . . . . .  | 9                 | 4  | 4  |                     |    |    |
| Steward . . . . .   | 3                 | 0  | 0  |                     |    |    |
| Judge . . . . .   | 5                 | 15 | 2  |                     |    |    |
| Prizes . . . . .  | 35                | 0  | 0  |                     |    |    |
| Printing, &c. . . . .                                     | 1                 | 16 | 10 |                     |    |    |
|   |                   |    |    | 55                  | 16 | 4  |
| <b>BEEES:—</b>  |                   |    |    |                     |    |    |
| Grant from Council for Bee Tent . . . . .                 | ..                |    |    | 10                  | 0  | 0  |
|   |                   |    |    | 10                  | 0  | 0  |
| <b>PUBLIC ANNOUNCEMENTS:—</b>                             |                   |    |    |                     |    |    |
| Advertising . . . . .                                     | 259               | 1  | 7  | 183                 | 8  | 4  |
| Billposting . . . . .                                     | 127               | 18 | 0  | 141                 | 4  | 0  |
| Printing . . . . .  | 90                | 0  | 8  | 116                 | 11 | 11 |
| Rent of Placard-Frame Stores . . . . .                    | 4                 | 0  | 0  | 4                   | 0  | 0  |
|   |                   |    |    | 481                 | 0  | 3  |
| <b>SHOW REFRESHMENT CONTRACTS:—</b>                       |                   |    |    |                     |    |    |
| Shedding . . . . .  | 176               | 17 | 2  | 175                 | 1  | 9  |
| Printing, &c. . . . .                                     | 5                 | 11 | 0  | 11                  | 8  | 3  |
|   |                   |    |    | 182                 | 8  | 2  |
| <b>SHOW EXPENSES, UNAPPORTIONABLE:—</b>                   |                   |    |    |                     |    |    |
| Erecting Offices, other Buildings, and Hoarding . . . . . | 848               | 2  | 6  | 915                 | 9  | 8  |
| Carriage and Storage of Plant . . . . .                   | ..                |    |    | 133                 | 7  | 4  |
| Steward of Works . . . . .                                | 13                | 5  | 0  | 16                  | 1  | 0  |
| Stand Fittings . . . . .                                  | 101               | 4  | 4  | 116                 | 15 | 8  |
| Extension of Telegraph Wires . . . . .                    | 2                 | 5  | 8  | 7                   | 11 | 11 |
| Insurance of Plant . . . . .                              | 4                 | 10 | 0  | 4                   | 10 | 0  |
| Hire of Furniture . . . . .                               | 25                | 6  | 9  | 18                  | 4  | 2  |
| Mass Room . . . . .                                       | 5                 | 5  | 0  | 5                   | 5  | 0  |
| Gatekeepers . . . . .                                     | 55                | 12 | 9  | 62                  | 15 | 4  |
| Yardmen, Messengers, &c. . . . .                          | 15                | 15 | 8  | 19                  | 5  | 7  |
| Stewards of Finance and Treasurer . . . . .               | 25                | 10 | 7  | 24                  | 15 | 10 |
| Finance Office and Treasurer's Clerks . . . . .           | 41                | 12 | 4  | 47                  | 16 | 3  |
| Police . . . . .  | 78                | 1  | 6  | 108                 | 10 | 11 |
| Badges, &c. . . . .                                       | 2                 | 8  | 10 | 3                   | 2  | 0  |
| Catalogues for Press and Officials . . . . .              | 7                 | 10 | 0  | 7                   | 9  | 4  |
| Purchase of Plant . . . . .                               | 58                | 9  | 3  | 67                  | 1  | 4  |
| Printing and Stationery . . . . .                         | 36                | 13 | 11 | 33                  | 11 | 6  |
| Commission on Sale of Season Tickets . . . . .            | 3                 | 5  | 10 | 1                   | 8  | 10 |
| Carriage and Sundries . . . . .                           | 13                | 15 | 6  | 4                   | 19 | 0  |
|   |                   |    |    | 1,538               | 15 | 6  |
| Carried forward . . . . .                                 | ..                |    |    | £ 9,810             | 10 | 5  |

**TAUNTON MEETING, 1895.**

( cxiv )

Dr.

**CASH ACCOUNT—continued.**

| RECEIPTS.                           | 1895.<br>TAUNTON. |       |     | 11<br>Gru     |
|-------------------------------------|-------------------|-------|-----|---------------|
|                                     | £                 | s.    | d.  | £             |
| Brought forward . . . .             | ..                |       |     | 9,862 0 10    |
| <b>SCHOOLS:—</b>                    |                   |       |     |               |
| <b>FARMERY:—</b>                    |                   |       |     |               |
| Students' Fees . . . .              | £                 | s.    | d.  |               |
| Grant from Somerset County Council. | 210               | 13    | 1   |               |
|                                     |                   |       |     | 219 10 7      |
| <b>SOMERSET BUTTER.—</b>            |                   |       |     |               |
| Students' Fees . . . .              | 87                | 3     | 3   |               |
| Spectators' Admissions . .          | 8                 | 2     | 0   |               |
| Sales . . . .                       | 0                 | 19    | 4   |               |
|                                     |                   |       |     | 96 4 7        |
| <b>SOMERSET CHEESE:—</b>            |                   |       |     |               |
| Students' Fees . . . .              | 168               | 11    | 0   |               |
| Cheese and Butter sold . .          | 713               | 10    | 5   |               |
| Sale of Cheese-making Apparatus . . | 18                | 0     | 0   |               |
| Students' Fees . . . .              | 18                | 6     |     |               |
|                                     |                   |       |     | 1,776 12 7    |
|                                     |                   |       |     | 1,776 12 7    |
|                                     | £                 | 1,096 | 8 2 | £ 10,862 0 10 |



## CASH ACCOUNT—continued.

CR.

| P A Y M E N T S.                          | 1895.<br>TAUNTON. |    |    | 1894.<br>GUILDFORD. |    |    |
|---|-------------------|----|----|---------------------|----|----|
|   | £                 | s. | d. | £                   | s. | d. |
| Brought forward.                          |                   |    |    | 9,810               | 10 | 5  |
| SCHOOLS:—                                 |                   |    |    |                     |    |    |
| FARMERY:—                                 |                   |    |    |                     |    |    |
| Cost of Van and Fittings                  | 72                | 11 | 3  |                     |    |    |
| Cost of Tricycle                          | 7                 | 0  | 0  |                     |    |    |
| Wages and Instructor's Travelling         | 93                | 4  | 0  |                     |    |    |
| Expenses                                  |                   |    |    |                     |    |    |
| Coal, Iron, &c.                           | 13                | 16 | 7  |                     |    |    |
| Carriage and Cartage                      | 7                 | 1  | 3  |                     |    |    |
| Rent of Yards                             | 8                 | 10 | 6  |                     |    |    |
| Prizes and Judge at Competition           | 7                 | 2  | 0  |                     |    |    |
| Stewards' and Secretary's Travelling      | 3                 | 19 | 0  |                     |    |    |
| Expenses                                  |                   |    |    |                     |    |    |
| Printing, Stationery, Postage, and Office | 21                | 9  | 2  |                     |    |    |
|   | 236               | 3  | 9  |                     |    |    |
| SOMERSET BUTTER:—                         |                   |    |    |                     |    |    |
| Salaries and Expenses                     | 235               | 14 | 8  | 218                 | 15 | 4  |
| Steward's Time and Expenses               | 100               | 3  | 8  | 103                 | 9  | 0  |
| Judges' Time and Expenses                 | 22                | 6  | 6  | 20                  | 14 | 10 |
| Office Staff and Travelling               | 28                | 9  | 9  | 38                  | 2  | 9  |
| Engineer and other Dairy Attendants       | 59                | 16 | 2  | 59                  | 12 | 1  |
| Milk and Cream                            | 73                | 1  | 8  | 109                 | 12 | 4  |
| Ditto (1894)                              | 58                | 10 | 6  |                     |    |    |
| Coal, Salt, Ice, &c.                      | 30                | 16 | 3  | 36                  | 0  | 10 |
| Fittings                                  | 6                 | 10 | 9  | 6                   | 12 | 2  |
| Carriage of Plant                         | 32                | 9  | 10 | 25                  | 8  | 11 |
| Printing and Stationery                   | 4                 | 1  | 6  | 4                   | 8  | 6  |
| Postages and Telegrams                    | 14                | 1  | 5  | 12                  | 16 | 10 |
| Prizes to Students                        | 50                | 1  | 0  | 42                  | 9  | 0  |
| Repairing and replacing Plant             | 5                 | 6  | 5  | 24                  | 11 | 10 |
|   | 719               | 10 | 1  | 702                 | 14 | 5  |
| SOMERSET CHEESE:—                         |                   |    |    |                     |    |    |
| Salaries and Expenses                     | 133               | 0  | 0  | 132                 | 2  | 10 |
| Steward's Time and Expenses               | 61                | 2  | 2  | 61                  | 10 | 2  |
| Supervisor's Expenses                     | 15                | 0  | 0  | 15                  | 0  | 0  |
| Balliff's Wages                           | 47                | 18 | 1  | 44                  | 5  | 9  |
| Office Staff and Travelling               | 12                | 18 | 0  | 19                  | 8  | 11 |
| Milk                                      | 726               | 2  | 6  | 667                 | 4  | 11 |
| Rennet and Bandages                       | 3                 | 19 | 11 | 3                   | 18 | 3  |
| Coal, Salt, Ice, &c.                      | 5                 | 5  | 11 | 12                  | 17 | 8  |
| Fittings                                  | 0                 | 6  | 9  | 5                   | 13 | 0  |
| Carriage of Plant                         | 5                 | 2  | 9  | 2                   | 17 | 6  |
| Printing, Stationery, and Advertising     | 9                 | 16 | 10 | 10                  | 8  | 4  |
| Postages and Telegrams                    | 5                 | 6  | 6  | 5                   | 7  | 10 |
| Students' Board                           | 113               | 12 | 8  | 82                  | 18 | 7  |
| Repairing and replacing Plant             | 3                 | 13 | 0  | 27                  | 14 | 9  |
|   | 1,143             | 5  | 1  | 1,091               | 8  | 6  |
|   |                   |    |    | 1,862               | 15 | 2  |
| Carried forward                           | £ 2,098           | 18 | 11 | 9,810               | 10 | 5  |

Dr.

CASH ACCOUNT—continued.

| RECEIPTS.  |         | 1895.     |                | 18     |
|--|---------|-----------|----------------|--------|
|  |         | TAUNTON.  |                | GUILD  |
|  | £ s. d. | £ s. d.   | £ s. d.        | £      |
| Brought forward . . . . .  |         | 1,996 3 2 | 9,862 0 10     | 2      |
| SCHOOLS—continued.   |         |           |                |        |
| DEVON BUTTER :—  | £ s. d. |           |                |        |
| Students' Fees . . . . .   | 45 2 9  |           |                | 44     |
| Spectators' Admissions . . . . .                                 | 8 13 6  |           |                | 12     |
| Sale of Produce and Appliances . . . . .                         | 2 14 5  |           |                | 3      |
| Grant from County Council . . . . .                              | 500 0 0 |           |                | 804    |
|  |         | 556 10 8  |                | 864    |
| DORSET BUTTER . . . . .  |         |           |                | 217    |
|  |         |           | 2,552 13 10    | 2,913  |
| EXPERIMENTS:—  |         |           |                |        |
| Government Grant for 1894 . . . . .                              |         | 400 0 0   |                | 400    |
|  |         |           | 400 0 0        |        |
| Returned on Deposit Account . . . . .                            |         |           | 12,814 14 8    | 12,84  |
| Balance in Bank, Jan. 1, 1895 . . . . .                          |         |           | 164 0 9        | 50     |
| Balance due to Bank (Inclusive of outstanding Cheques) . . . . . |         |           | 338 4 0        | 44     |
|  |         |           | £ 13,316 19 11 | 13,294 |

CASH ACCOUNT—*continued.*

CR.

| P A Y M E N T S.                     | 1895.<br>TAUNTON. |           | 1894.<br>GUILDFORD. |       |
|--------------------------------------|-------------------|-----------|---------------------|-------|
|                                      | £                 | s. d.     | £                   | s. d. |
| Brought forward . . . . .            | 2,098             | 18 11     | 9,810               | 10 5  |
| <i>continued.</i>                    |                   |           |                     |       |
| UTTER:—                              | £                 | s. d.     |                     |       |
| and Expenses . . . . .               | 233               | 1 9       | 229                 | 19 4  |
| P's Time and Expenses . . . . .      | 126               | 1 0       | 163                 | 14 2  |
| Time and Expenses . . . . .          | 2                 | 12 6      | 11                  | 5 6   |
| Staff and Travelling . . . . .       | 26                | 6 0       | 36                  | 0 6   |
| Attendants . . . . .                 | 36                | 18 3      | 31                  | 18 5  |
| and Cream . . . . .                  | 63                | 18 3      | 72                  | 14 9  |
| dit, ice, &c. . . . .                | 24                | 18 1      | 26                  | 11 6  |
| of Plant . . . . .                   | 4                 | 9 6       | 3                   | 4 9   |
| and Stationery . . . . .             | 30                | 5 6       | 20                  | 9 9   |
| and Telegrams . . . . .              | 1                 | 11 6      | 2                   | 15 3  |
| Students . . . . .                   | 8                 | 19 11     | 11                  | 10 1  |
| ing and replacing Plant . . . . .    | 43                | 14 6      | 45                  | 13 6  |
|                                      | 1                 | 6 10      | 4                   | 0 5   |
|                                      | 608               | 2 7       | 659                 | 17 11 |
| NEOC'S. . . . .                      | ..                | ..        | 101                 | 0 0   |
| TS:—                                 |                   | 2,707 1 0 | 2,554               | 0 10  |
| 1894) . . . . .                      | 1                 | 11 6      | 88                  | 19 11 |
| (1894) . . . . .                     | 23                | 8 7       | ..                  | ..    |
| and Stationery . . . . .             | 20                | 5 3       | 15                  | 1 0   |
| s Time, Travelling, Post-} . . . . . | 38                | 7 4       | 4                   | 6 10  |
| c. . . . .                           | 39                | 10 0      | ..                  | ..    |
| o Ditto (1894) . . . . .             | 23                | 6 8       | 23                  | 6 8   |
| y and Office . . . . .               | 18                | 0 3       | ..                  | ..    |
| Balliff, and Inspection . . . . .    | 101               | 14 6      | ..                  | ..    |
| o Ditto (1894) . . . . .             | 10                | 8 1       | ..                  | ..    |
| ng Chemist for Travelling . . . . .  | 276               | 12 2      | 131                 | 14 5  |
| 1893) . . . . .                      | 78                | 10 0      | 80                  | 0 0   |
| 1893) . . . . .                      | ..                | ..        | 14                  | 8 0   |
| 1893) . . . . .                      | 21                | 10 0      | 15                  | 0 0   |
| 1893) . . . . .                      | ..                | ..        | 10                  | 0 0   |
| 1893) . . . . .                      | 9                 | 6 8       | 9                   | 6 8   |
| lon to St. Brienc . . . . .          | 18                | 13 2      | 10                  | 11 0  |
| 22                                   | 2 9               | ..        | ..                  | ..    |
| 150                                  | 2 7               | 139       | 5 8                 |       |
| nd Assistant . . . . .               | 282               | 5 3       | 297                 | 14 10 |
| d Lodgings . . . . .                 | 31                | 9 10      | 23                  | 16 10 |
| and Publishing . . . . .             | 31                | 11 6      | 87                  | 19 0  |
| r and Office . . . . .               | 27                | 6 8       | 27                  | 6 8   |
| &c. . . . .                          | ..                | ..        | 4                   | 8 6   |
| for Analyses . . . . .               | ..                | ..        | 18                  | 0 0   |
| 372                                  | 13 3              | 428       | 5 10                |       |
| 799                                  | 8 0               | 699       | 5 11                |       |
| nce in Bank . . . . .                | ..                | ..        | 164                 | 0 9   |
| £13,316                              | 19 11             | 13,294    | 12 1                |       |

that I have examined the foregoing accounts for the year 1895, compared the vouchers, and found them all in order and correct.

ALBERT GOODMAN, F.C.A.,

Auditor.

Passed by Council,

Jan. 28th, 1896.

THOS. F. FLOWMAN,

Secretary.

## TAUNTON MEETING, 1895.

## LIABILITIES TO DECEMBER 31st, 1895, WITH COMPARISON FOR 1894.

|                                     | 1895.<br>TAUNTON. |       | 1894.<br>GUILDFORD. |       | LIABILITIES.                                   |   | 1895.<br>TAUNTON. |       | 1894.<br>GUILDFORD. |       |
|-------------------------------------|-------------------|-------|---------------------|-------|--|---|-------------------|-------|---------------------|-------|
|                                     | £                 | s. d. | £                   | s. d. |  |   | £                 | s. d. | £                   | s. d. |
| PLANT & WORKS,<br>Do. (SCHOOLS,     | 740               | 17 6  | 764                 | 14 6  | DEFERRED PRIZES,                               | . | 65                | 0 0   | 30                  | 0 0   |
|                                     | 57                | 14 11 | 72                  | 3 8   |  | . |                   |       |                     |       |
|                                     |                   |       | 836                 | 18 2  | ST. ALBANS MEETING,                            | . | 800               | 0 0   | 800                 | 0 0   |
| SUBSCRIPTION ARREARS                | .                 | .     | 132                 | 16 0  |  | . |                   |       |                     |       |
| DIVIDENDS DUE                       | .                 | .     | 4                   | 1 2   | JOURNAL, cost of forthcoming, estimated at     | . | 450               | 0 0   | 450                 | 0 0   |
| ACCOUNTS DUE                        | .                 | .     | 2                   | 18 9  |  | . |                   |       |                     |       |
| DUE FROM COUNTY COUNCILS ON SCHOOLS | .                 | .     | 16                  | 13 2  |  | . |                   |       |                     |       |
| ACCOUNTS                            | .                 | .     | 21,423              | 14 6  | DUE TO COUNTY COUNCILS ON SCHOOLS              |   | 296               | 13 6  | 432                 | 8 0   |
|                                     | .                 | .     | 164                 | 0 9   | ACCOUNTS                                       | . |                   |       |                     |       |
| Balance in Bank on Dec. 31, 1894    | .                 | .     | 21,432              | 14 6  | DUE TO BANK (inclusive of outstanding Cheques) | . | 358               | 4 6   | ..                  |       |
|                                     | .                 | .     | 21,664              | 7 9   |  | . |                   |       |                     |       |
|                                     | .                 | .     |                     |       | OTHER OUTSTANDING ACCOUNTS                     | . | 212               | 2 0   | 140                 | 0 0   |
|                                     | .                 | .     |                     |       |  | . |                   |       |                     |       |
|                                     | .                 | .     |                     |       | Balance  | . | 2,168             | 18 2  | 1,852               | 8 0   |
|                                     | .                 | .     |                     |       |  | . | 19,263            | 16 4  | 19,861              | 16 9  |
|                                     | .                 | .     |                     |       |  | . | 21,432            | 14 6  | 21,664              | 7 9   |

# Bath and West and Southern Counties Society,

FOR THE

*Encouragement of Agriculture, Arts, Manufactures, and Commerce.*

## List of Members.

CORRECTED TO JANUARY 28TH, 1896, INCLUSIVE.

### PATRON.

HIS ROYAL HIGHNESS THE PRINCE OF WALES, K.G.

### PRESIDENT

FOR 1895-96.

THE RIGHT HON. THE EARL OF CLARENDON.

### TRUSTEES.

RIGHT HON. SIR T. D. ACLAND, BART.

SIR J. F. LENNARD, BART.

RIGHT HON. SIR R. H. PAGET, BART., M.P.

*Names thus (\*) distinguished are Governors.*

*Names thus (†) distinguished are Life Members.*

*\*\* Members are particularly requested to make the Secretary acquainted with any errors in the names or residences.*

| Name.  | Residence.   | Sub-<br>scriptions. |
|--|--|---------------------|
| † WALES, HIS ROYAL HIGHNESS<br>THE PRINCE OF . . . . . | Sandringham, Norfolk . . . . .   | £ s. d.<br>. . .    |
| † York, H.R.H. The Duke of,<br>K.G. . . . .            | York Cottage, Sandringham . . . . .  | . . .               |
| † Ackers, B. St. John . . . . .                        | Huntley Manor, Huntley, near<br>Gloucester . . . . .                                 | . . .               |
| Acland, Sir H. W., Bart.,<br>K.C.B., M.D., &c. . . . . | Oxford . . . . .   | 1 0 0               |
| * Acland, Right Hon. Sir T.<br>Dyke, Bart. . . . .     | Killerton, Exeter . . . . .  | 5 0 0               |
| Acland, Alfred Dyke . . . . .                          | 38, Pont Street, Belgrave Square,<br>London, S.W. . . . .                            | 1 0 0               |
| * Acland, Charles T. D. . . . .                        | Killerton, Exeter . . . . .  | 2 0 0               |
| † Acland, Rt. Hon. A. H. Dyke,<br>M.P. . . . .         | 28, Cheyne Walk, London, S.W.<br>Horner Farm, West Linccombe,<br>Minchhead . . . . . | . . .<br>0 10 0     |
| Adams, A. . . . .                                      |  |                     |

| Name.                                  | Residence.   |
|--|--|
| Adams, George . . . . .                | Royal Prize Farm, Pidnel, Farnham, Berks . . . . . |
| Adams, S. W., jun. . . . .             | 7, Boringdon Villas, Plympton, Mary . . . . .      |
| *Addington, Lord . . . . .             | Addington House, Windsor, Bucks. . . . .           |
| Affleck, W. . . . .                    | Prospect House, Swindon . . . . .                  |
| †Agate, Alfred . . . . .               | Broomhall, Horsham . . . . .                       |
| Aiken, J. C. . . . .                   | The Glen, Stoke Bishop, Gloucestershire . . . . .  |
| Alexander, D. T. . . . .               | Cardiff . . . . .                                  |
| †Allen, Col. E. . . . .                | Fullwood Barracks, Preston . . . . .               |
| †Allen, James D. . . . .               | Springfield House, Shepton Mallet . . . . .        |
| Allen, Joseph . . . . .                | Springfield House, Evercreech . . . . .            |
| Allen and Sons . . . . .               | Shepton Mallet . . . . .                           |
| Allmand, F. . . . .                    | Victoria Flour Mills, Wrexham . . . . .            |
| *†Amherst, Earl . . . . .              | Montreal, Sevenoaks . . . . .                      |
| Anglo-Bavarian Brewery Co. . . . .     | Shepton Mallet . . . . .                           |
| Anglo-Swiss Condensed Milk Co. . . . . | Chippenham . . . . .                               |
| Archer, C. . . . .                     | Trelaske, near Launceston . . . . .                |
| †Arkwright, J. H. . . . .              | Hampton Court, Leominster . . . . .                |
| Armstrong, J. D. . . . .               | Vallis Farm, Frome . . . . .                       |
| *Ashburton, Lord . . . . .             | The Grange, Alresford, Hampshire . . . . .         |
| †Ashcombe, Lord . . . . .              | 7, Prince's Gate, London, S.W. . . . .             |
| Ashcroft, W. . . . .                   | Hayes, Beckenham, Kent . . . . .                   |
| Ashford, E. C., M.D. . . . .           | The Moorlands, Bath . . . . .                      |
| Aubrey, T. . . . .                     | 19, Paragon, Bath . . . . .                        |
| †Aveling, Thomas L. . . . .            | Rochester . . . . .                                |
| Avon Manure Co. . . . .                | St. Philip's Marsh, Bristol . . . . .              |
| Awdry, P. D. . . . .                   | Chippenham . . . . .                               |
| Ayshford-Wise, Mayor Lovat . . . . .   | Watts House, Bishop's Lyde . . . . .               |

|                                    |  |
|------------------------------------|--|
| Baber, S. . . . .                  | Elborough Farm, Locle, Weston-super-Mare . . . . . |
| Badcock, H. Jeffries. . . . .      | Taunton . . . . .                                  |
| Badcock, W. L. . . . .             | Pitminster Lodge, Taunton . . . . .                |
| Bailey, H. . . . .                 | St. Stephens, St. Albans . . . . .                 |
| Bailey, J. . . . .                 | Nyuehead, Wellington, Somerset . . . . .           |
| †Baillie, Evan . . . . .           | Filleigh, Chudleigh . . . . .                      |
| Bailwood, F. H. M. . . . .         | Horsington, Wincanton . . . . .                    |
| †Bainbridge, Captain J. H. . . . . | Beechwood, Sparkwell, Plymouth . . . . .           |
| Baker, F. . . . .                  | Manor Farm, Frindsbury, Kent . . . . .             |
| Baker, G. E. Lloyd . . . . .       | Hardwicke Court, nr. Gloucester . . . . .          |
| †Baker, L. J. . . . .              | Chertsey Park, Surrey . . . . .                    |

| Name.                             | Residence.  | Subscriptions. |    |    |
|-----------------------------------|---|----------------|----|----|
|                                   |   | £              | s. | d. |
| Robert N. G. . . . .              | Heavitree, Exeter . . . . .                           |                |    |    |
| S. L. . . . .                     | Chapel Farm, Penhow, Chepstow,<br>Mon. . . . .        | 1              | 0  | 0  |
| T. H. . . . .                     | Mere Down, Mere . . . . .                             | 0              | 10 | 0  |
| William . . . . .                 | Eastbury, Epsom Road, Guildford . . . . .             | 1              | 0  | 0  |
| William . . . . .                 | Temple Street, Bristol . . . . .                      | 1              | 0  | 0  |
| Samuel . . . . .                  | Westacott Nursery, Barnstaple . . . . .               | 1              | 0  | 0  |
| on, W. E. . . . .                 | Barvin, Potter's Bar, Herts. . . . .                  | 2              | 0  | 0  |
| rd, H., and Sons . . . . .        | Uttometer . . . . .                                   | 1              | 0  | 0  |
| tt, A. C. . . . .                 | Thirsk, Yorkshire . . . . .                           | 1              | 0  | 0  |
| s, A. . . . .                     | Wolveton, Dorchester . . . . .                        | 1              | 0  | 0  |
| rd, F. . . . .                    | Horsted Place, near Uckfield . . . . .                | 1              | 0  | 0  |
| l and Perkins. . . . .            | Peterborough . . . . .                                | 1              | 0  | 0  |
| n, G. T. . . . .                  | College Farm, Finchley . . . . .                      | 1              | 0  | 0  |
| , C. A. . . . .                   | Solesbridge, Chorleywood, Herts. . . . .              | 1              | 0  | 0  |
| tt, Henry . . . . .               | Glympton Park, Woodstock . . . . .                    | 2              | 0  | 0  |
| , Major William . . . . .         | Moredon, North Curry, Taunton . . . . .               | 1              | 0  | 0  |
| J. A. . . . .                     | Nailstone Stud, Nailstone, near<br>Nuneaton . . . . . | 1              | 0  | 0  |
| w, J. J. J. . . . .               | The Lodge, Weston-super-Mare . . . . .                | 1              | 1  | 0  |
| , John . . . . .                  | Hackwood Farm, Basingstoke . . . . .                  | 1              | 0  | 0  |
| ot, Major Walter . . . . .        | Coates, Pulborough, Sussex . . . . .                  | 1              | 1  | 0  |
| tt, C. H. . . . .                 | Pilton House, Barnstaple . . . . .                    |                |    |    |
| rd, B. J. P. . . . .              | Kitley, Yealmpton, Ivybridge . . . . .                | 2              | 0  | 0  |
| , Marquess of . . . . .           | Longleat, Warminster . . . . .                        |                |    |    |
| nd Wells, The Bishop of . . . . . | The Palace, Wells . . . . .                           | 1              | 1  | 0  |
| has Co. . . . .                   | Bath . . . . .  | 1              | 0  | 0  |
| irst, Earl . . . . .              | Cirencester House, Cirencester . . . . .              | 2              | 2  | 0  |
| A. . . . .                        | Westown, Bristol . . . . .                            | 1              | 0  | 0  |
| , E. C., F.R.S.E. . . . .         | Thornfalcon, Taunton . . . . .                        | 1              | 0  | 0  |
| -Pool, R. H. . . . .              | Road Manor, Bath . . . . .                            | 1              | 0  | 0  |
| hill, W. J. . . . .               | St. Loyes, Exeter . . . . .                           |                |    |    |
| on, Edward . . . . .              | Broadway, Dorchester . . . . .                        | 1              | 0  | 0  |
| , W. H. . . . .                   | Gelderd Road, Leeds . . . . .                         | 1              | 0  | 0  |
| 7, R. . . . .                     | Torr Grove, Plymouth . . . . .                        |                |    |    |
| amp, E. B. . . . .                | Trevince, Scorrier, Truro . . . . .                   | 1              | 0  | 0  |
| y, M. H., M.P. . . . .            | Coombe Priory, Shaftesbury . . . . .                  | 1              | 0  | 0  |
| l, J. F. . . . .                  | Primley Hill, Paignton, Torquay . . . . .             | 1              | 0  | 0  |
| -Stanford, J. . . . .             | Pyt House, Tisbury . . . . .                          | 1              | 1  | 0  |
| tt, Jos. . . . .                  | Down House, Dursley, Glos. . . . .                    | 1              | 0  | 0  |
| tt, J. G. . . . .                 | Malvern Link . . . . .                                | 1              | 0  | 0  |
| tt Brothers . . . . .             | Journal Office, Salisbury . . . . .                   | 1              | 1  | 0  |
| l, Edward Hammond, & . . . . .    |   |                |    |    |
|                                   | Heybridge, Maldon, Essex . . . . .                    | 1              | 0  | 0  |
| on, R. . . . .                    | Englefield House, Reading . . . . .                   | 5              | 0  | 0  |
| 3. . . . .                        | Milverton, Somerset . . . . .                         | 1              | 0  | 0  |
| ie, Lord . . . . .                | Uffington House, Stamford . . . . .                   |                |    |    |
| ier, H. W. . . . .                | Highlands, Taunton . . . . .                          | 1              | 0  | 0  |
| u. R. . . . .                     | Abbot's Aun, Andover . . . . .                        | 1              | 0  | 0  |
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| Col. George . . . . .             | Charlton House, Ludwell, Salis-<br>bury . . . . .     |                |    |    |

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| Blackstone and Co. (Limited)                         | Rutland Iron Works, Stamford,<br>Lincoln . . . . .           | 1              | 1  | 0  |
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| Blinman, H. T. . . . .                               | Parsonage Farm, Farrington<br>Gurney, Bristol . . . . .      | 0              | 10 | 0  |
| Blundell, R. C. . . . .                              | Benhams, Horley, Surrey . . . .                              | 1              | 0  | 0  |
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| Boby, Robert . . . . .                               | Bury St. Edmunds, Suffolk . . .                              | 1              | 0  | 0  |
| Bodman, G. . . . .                                   | Park Farm, Yatton . . . . .                                  | 1              | 0  | 0  |
| Bolitho, T. B., M.P. . . . .                         | Treidden, Penzance . . . . .                                 | 1              | 0  | 0  |
| †Bond, N. . . . .                                    | Creech Grange, Wareham, Dorset .                             |                |    |    |
| *Boteler, Capt. W. J. Casberd                        | The Elms, Taplow . . . . .                                   | 2              | 0  | 0  |
| †Boughton-Knight, A. R. . . .                        | Downton Castle, Ludlow . . . . .                             |                |    |    |
| Bound, William . . . . .                             | Hurstborne, Tarrant, Andover . .                             | 1              | 1  | 0  |
| Bourne, C. H. . . . .                                | Wellington Road, Dudley . . . .                              | 1              | 1  | 0  |
| Bouverie, Hon. D. P. . . . .                         | Coleshill House, Highworth . . .                             | 1              | 1  | 0  |
| Bouverie, H. P. . . . .                              | Brymore, Bridgwater . . . . .                                | 1              | 0  | 0  |
| †Bowen-Jones, J. . . . .                             | Eusdon House, Montford Bridge .                              |                |    |    |
| †Bowerman, Alfred . . . . .                          | Capton, Williton . . . . .                                   |                |    |    |
| Boyle, M. . . . .                                    | Timsbury, Bath . . . . .                                     | 1              | 0  | 0  |
| Boys, T. H. . . . .                                  | Bridgwater . . . . .   | 1              | 0  | 0  |
| Braby, E. E. . . . .                                 | Drungewick Manor House, Rudg-<br>wick, Horsham . . . . .     | 1              | 0  | 0  |
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| †Brassey, A., M.P. . . . .                           | Heythrop, Chipping Norton,<br>Oxon . . . . .                 |                |    |    |
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| Breudon, G. . . . .                                  | Broomhill, Stratton, North Devon                             | 1              | 0  | 0  |
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| Bristol Wagon Works Com-<br>pany (Limited) . . . . . | Lawrence Hill, Bristol . . . . .                             | 1              | 1  | 0  |
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| †Broadmead, W. B. . . . .                            | Enmore Park, Bridgwater . . . .                              |                |    |    |
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| Broderip, E. . . . .                                 | Cossington, Somerset . . . . .                               | 1              | 0  | 0  |
| Brown, William Jeffery . . . .                       | Middlehill House, Box, Wilts . .                             | 1              | 0  | 0  |
| Browne, Solomon . . . . .                            | Barton, Landrake, St. Germans . .                            | 0              | 10 | 0  |
| Brown, C. G. Prideaux . . . .                        | Prideaux Castle, Padstow . . . .                             | 1              | 0  | 0  |



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| †Bryce, J. P. . . . .              | Bystock, near Exmouth . . . .                                 | . . .               |
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| Buckley, W. J. . . . .             | Llanelly . . . . .  | 1 0 0               |
| Bucknell, B. . . . .               | Holcombe Rogus, Wellington,<br>Somerset . . . . .             | 1 0 0               |
| Budd, C. H. . . . .                | Land Surveyor, Shepton Mallet .                               | 1 0 0               |
| Budgett, W. E. . . . .             | Stoke Bishop, near Bristol . . .                              | 1 1 0               |
| †Buller, Admiral A. . . . .        | Erle Hall, Plympton . . . . .                                 | . . .               |
| Bulteel, John . . . . .            | Pamflete, Ivybridge . . . . .                                 | 1 0 0               |
| Buncombe, E. A. . . . .            | Coombe Florey, Taunton . . . .                                | 1 0 0               |
| Burbidge, Edwin . . . . .          | South Wraxall, Bradford-on-Avon.                              | 1 0 0               |
| Burbidge, W. . . . .               | Chippenham . . . . .  | 1 0 0               |
| Burge, William . . . . .           | Stoke Farm, Charles, South Molton                             | 0 10 0              |
| Burghclere, Lord. . . . .          | Debden Hall, Saffron Walden. .                                | 1 0 0               |
| Burnard, R. . . . .                | Cattedown, Plymouth . . . . .                                 | 1 0 0               |
| Burnett, J. . . . .                | Island House, Highbridge . . . .                              | 1 0 0               |
| Burrell, C., and Sons. . . . .     | St. Nicholas Works, Thetford . .                              | 1 0 0               |
| †Burrell, Sir C. R., Bart. . . . . | Knepp Castle, Sussex . . . . .                                | . . .               |
| Bush, Mrs. L. E. . . . .           | Ellaston, Atlantic Road South,<br>Weston-super-Mare . . . . . | 1 0 0               |
| Buss, E. . . . .                   | Elphicks, Horsmonden, Kent. . .                               | 1 0 0               |
| Buswell, C. and W. . . . .         | Torquay . . . . .   | 1 0 0               |
| Butcher, G., & Co. . . . .         | Bath . . . . .  | 1 0 0               |
| Butterworth, R. W. . . . .         | Percy House, Kensington, Bath .                               | 1 0 0               |
|                                    |   |                     |
| Calmady, V. P. . . . .             | Tetcott, near Holsworthy, Devon                               | 1 0 0               |
| Calvert, Col. A. M. . . . .        | Ockley Court, Dorking . . . . .                               | 1 0 0               |
| Campbell, C. Lee . . . . .         | Glewstone Court, Ross . . . . .                               | 1 0 0               |
| Campion, W. H. . . . .             | Dannev, Hassocks, Sussex. . . .                               | 1 0 0               |
| Candy, T. C. . . . .               | Woolcombe, Cattistock, Dorset .                               | 1 0 0               |
| Cannon, H. . . . .                 | Milton Clevedon, Evercreech . .                               | 1 0 0               |
| Caple, Geo. . . . .                | Stanton Prior, Bristol . . . . .                              | 1 0 0               |
| Carew, C. . . . .                  | Collipriest, Tiverton. . . . .                                | 1 0 0               |
| *Carew-Gibson, G. C. . . . .       | Kingsfold, Billingshurst, Sussex.                             | 2 0 0               |
| †Carey, P. W. . . . .              | Cardiff . . . . .   | . . .               |
| *Carlingford, Lord . . . . .       | The Priory, Chewton Mendip,<br>near Bath . . . . .            | 2 2 0               |
| Carr, L. . . . .                   | Court-y-bel, Penarth, Glam. . . .                             | 1 0 0               |
| †Carter, E. . . . .                | Puckpool House, Ryde, Isle of<br>Wight . . . . .              | . . .               |
| Carter, J., and Co. . . . .        | 238, High Holborn, London . . .                               | 1 0 0               |
| †Cartwright, F. F. . . . .         | 7, Percival Road, Clifton . . . .                             | . . .               |

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|   |  | scriptions. |
|   |  | £ s. d.     |
| Carver, H. R. . . . .                   | West House, Chilton Polden,<br>Bridgwater . . . . .                | 1 0 0       |
| Cary, Edmund . . . . .                  | Pylle, Shepton Mallet . . . . .                                    | 0 10 0      |
| †Cary, W. H. . . . .                    | Steeple Ashton, Trowbridge . . . . .                               | ..          |
| Cater, R. B. . . . .                    | Bath . . . . .   | 1 1 0       |
| Cathedral Dairy Co. . . . .             | Exeter . . . . .   | 1 1 0       |
| †Catt, C. W. . . . .                    | 52, Middle Street, Brighton (Hon.<br>Local Sec., 1885) . . . . .   | ..          |
| *Cawdor, Earl of . . . . .              | Stackpole Court, Penibroke . . . . .                               | 2 0 0       |
| Cecil, Lord A. . . . .                  | Orchardmains, Tunbridge . . . . .                                  | 1 0 0       |
| Cecil, Lord L. . . . .                  | Orchardmains, Tunbridge . . . . .                                  | 1 0 0       |
| *Chaloner, Capt. R. G. W. . . . .       | Melksham House, Melksham,<br>Wilts . . . . .                       | 2 0 0       |
| Champion, F. . . . .                    | West Pennard, Somerset . . . . .                                   | 1 0 0       |
| †Chapman, C. . . . .                    | Carlecotes Hall, Dunford Bridge,<br>near Sheffield . . . . .       | ..          |
| Chapman, Rev. H. . . . .                | Donhead St. Andrew, Salisbury . . . . .                            | 1 0 0       |
| Chapman, W. W. . . . .                  | Fitzalen House, Arundel Street,<br>Strand, London . . . . .        | 1 0 0       |
| Chard, T. T. . . . .                    | Beresford House, Upper Belgrave<br>Road, Clifton . . . . .         | 1 1 0       |
| Cheetham, F. H. . . . .                 | Tetton House, Kingston, Taunton . . . . .                          | 1 0 0       |
| Chichester, C. A. W. . . . .            | Manor House, Bishops Hull,<br>Taunton . . . . .                    | 1 0 0       |
| Chick, John . . . . .                   | Compton Valence, Dorchester . . . . .                              | 1 0 0       |
| Chorley, W. L. . . . .                  | Quarrie, Dunster, Somerset . . . . .                               | 1 0 0       |
| Chown, Richard . . . . .                | Holcombe Farm, Exbridge,<br>Tiverton . . . . .                     | 0 10 0      |
| Churchouse, A. . . . .                  | Perridge House, near Shepton<br>Mallet . . . . .                   | 1 0 0       |
| *Clarendon, Earl of . . . . .           | The Grove, Watford . . . . .                                       | 2 2 0       |
| Clark, Isaac . . . . .                  | West Lynch, Selworthy . . . . .                                    | 1 0 0       |
| Clark, James . . . . .                  | Street, Glastonbury . . . . .                                      | 1 0 0       |
| †Clark, J. J. . . . .                   | Goldstone Farm, West Brighton<br>(Hon. Local Sec., 1885) . . . . . | ..          |
| Clark, W. S. . . . .                    | Street, Glastonbury . . . . .                                      | 1 0 0       |
| Clarke, Joshua . . . . .                | Minehead . . . . .   | 1 0 0       |
| †Clarke, T. E., Capt. . . . .           | Alcombe, Cote, Dunster . . . . .                                   | ..          |
| Clarke, W. . . . .                      | East Lynch, near Minehead,<br>Somerset . . . . .                   | 1 0 0       |
| Clayden, H. . . . .                     | Northoe, Park View, Hoddesdon . . . . .                            | 1 1 0       |
| *Clayton, Shuttleworth, and Co. . . . . | Lincoln . . . . .  | 2 2 0       |
| Clall, S. . . . .                       | Berwick, Bridport . . . . .  | 1 0 0       |
| Cleave, B. C. . . . .                   | Sanctuary, Crediton, Devon . . . . .                               | 1 1 0       |
| Cleave, W. C. . . . .                   | Sanctuary, Crediton, Devon . . . . .                               | 1 1 0       |
| Clerk, Edmund H. . . . .                | Burford, Shepton Mallet . . . . .                                  | 1 0 0       |
| †Clifford, Lord . . . . .               | Ugbrook, Chudleigh . . . . .                                       | ..          |
| Clift, L. E. . . . .                    | 1, Holborn Place, High Holborn,<br>London, W.C. . . . .            | 1 0 0       |
| *Clinton, Lord . . . . .                | Heanton Satchville, Beaford,<br>North Devon . . . . .              | 2 2 0       |
| Clothier, Frederick . . . . .           | Bristol Road, Weston-super-Mare . . . . .                          | 0 10 0      |

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| on, John . . . . .                | Woodhatch House, Reigate . . . . .                         | 1 0 0            |
| on, Robert Gen. . . . .           | 2, Whitehall Place, London . . . . .                       | 0 10 0           |
| on, R. W. . . . .                 | Doner's Lodge, Reigate . . . . .                           | 1 0 0            |
| s, S. B. . . . .                  | Stanton Drew Court, Pensford . . . . .                     | 1 0 0            |
| H. M. . . . .                     | Higham, Kent . . . . .                                     | 1 0 0            |
| y and Sons . . . . .              | Frome Selwood . . . . .                                    | 0 10 0           |
| T. . . . .                        | Gollege Farm, Wells, Somerset . . . . .                    | 1 0 0            |
| C. . . . .                        | Manor House, Winterbourne<br>Stoke, Salisbury . . . . .    | 1 0 0            |
| t, W. . . . .                     | Westmead, Bridport . . . . .                               | 1 0 0            |
| gbourne, J. S. . . . .            | Aston, Ingham, near Ross. . . . .                          | 1 0 0            |
| s, C. . . . .                     | Longhouse Farm, Oldford, Frome . . . . .                   | 1 0 0            |
| s, C. R. . . . .                  | Hartwell House, Exeter . . . . .                           | 1 1 0            |
| s, D. . . . .                     | Newton Ferrars, Carrington, Corn-<br>wall . . . . .        | 1 0 0            |
| in, J. J., M.P. . . . .           | Carrow House, Norwich . . . . .                            | 1 1 0            |
| er, Jas. . . . .                  | Redland Knoll, Bristol . . . . .                           | 1 1 0            |
| ton, E., M.P. . . . .             | Roundway Park, Devizes . . . . .                           | 2 2 0            |
| arst, Symons, and Co. . . . .     | Bridgwater . . . . .                                       | 1 0 0            |
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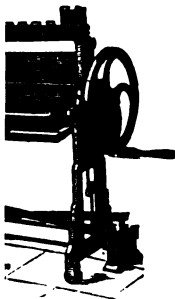
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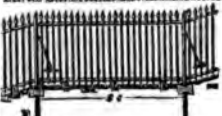
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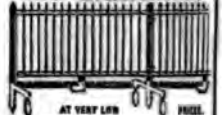
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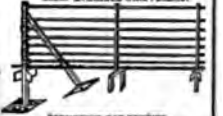
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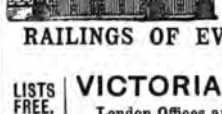
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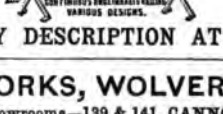
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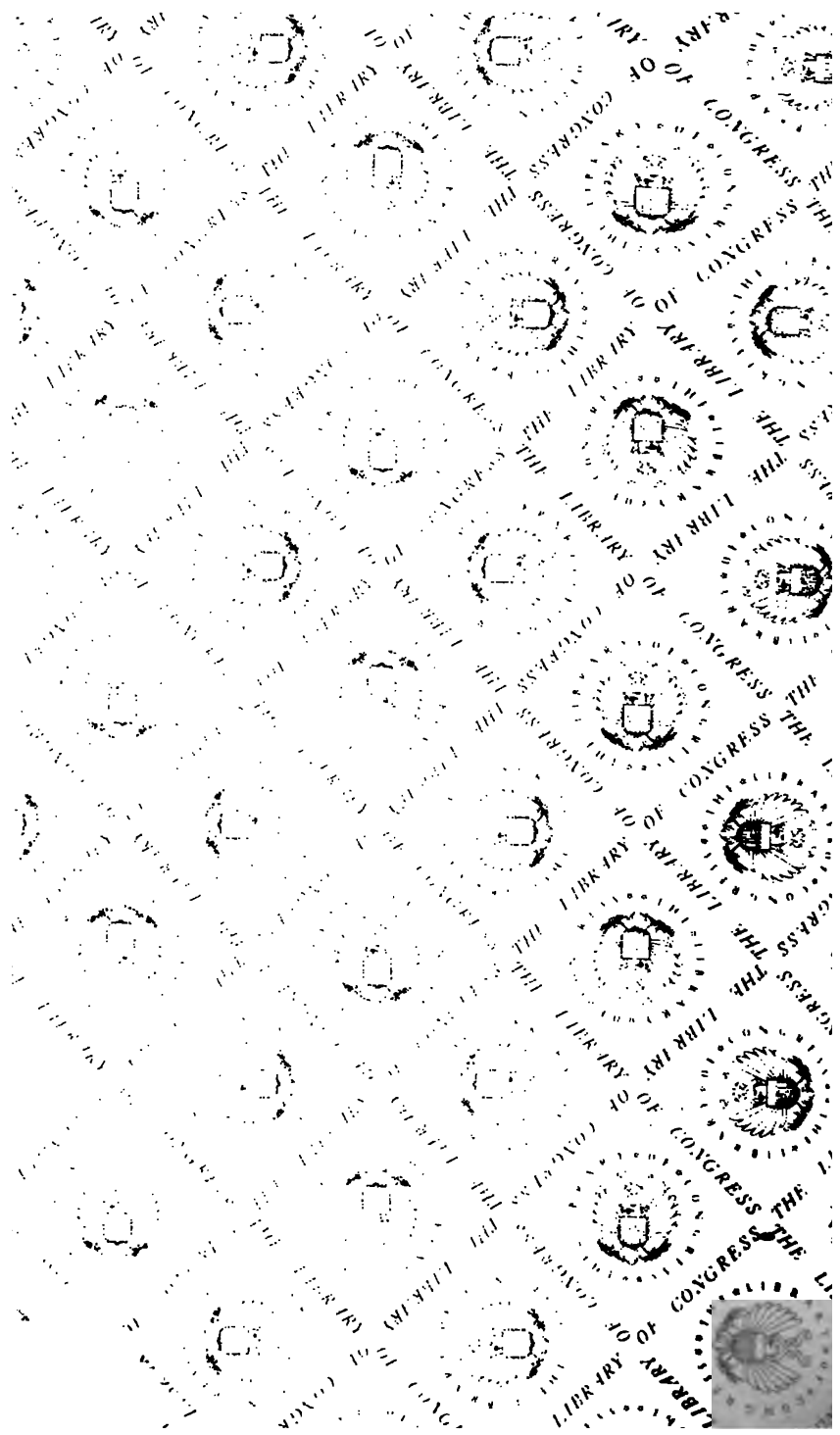
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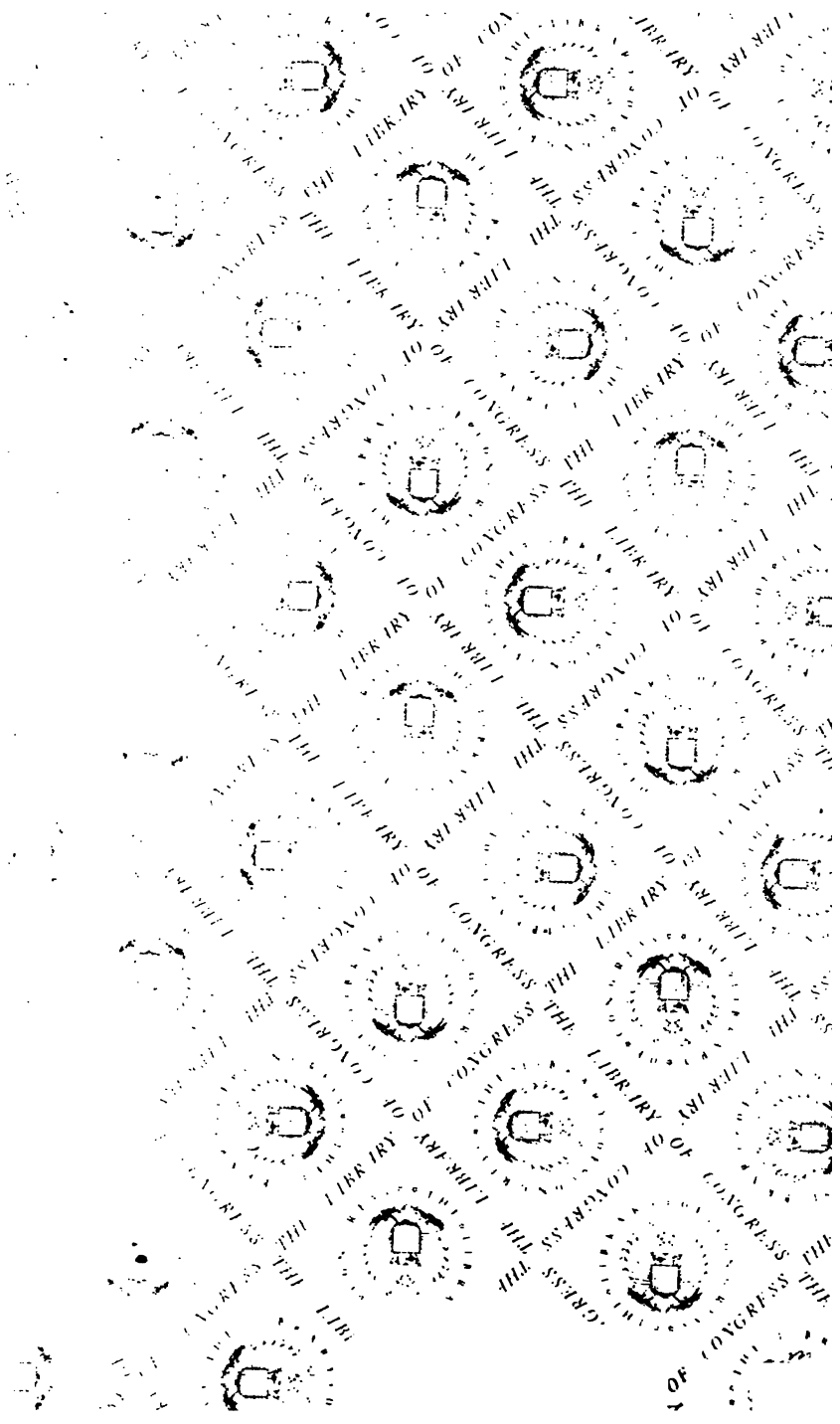












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